

Gov Doc

XI
IES
99/2

BOSTON PUBLIC LIBRARY



3 9999 10105 725 3





Digitized by the Internet Archive
in 2024 with funding from
Boston Public Library

<https://archive.org/details/phaseiisiteasses00iesi>

GOVDOC

X1
IES
99/2

IES, INC.

ENVIRONMENTAL CONSULTANTS

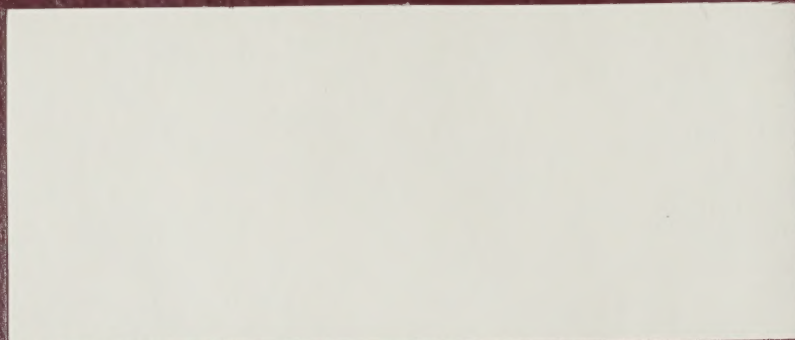
Phase II Site Assessment

1575 VFW Parkway
West Roxbury, MA
RTN's 3-2126 & 3-14019

Project #797-159
(February 2, 1999)



1152 INC.



900. 99-313

Phase II Site Assessment

1575 VFW Parkway
West Roxbury, MA
RTN's 3-2126 & 3-14019

Project #797-159
(February 2, 1999)



IES, INC.

ENVIRONMENTAL CONSULTANTS

265 MEDFORD ST. • SOMERVILLE, MA 02143

(617) 623-8880 • FAX # (617) 629-2920

IESINC@AOL.COM

Direct Dial Numbers

David P. Borans: (617) 776-8549

Cosmo D. Capobianco: (617) 623-8883

Kerry Asetta: (617) 776-0578

David Brincheiro: (617) 776-1950

John R. DiPietro: (617) 623-6204

Gerard R. Goguen: (617) 623-5158

Daniel G. Jaffe: (617) 776-2715

February 2, 1999

Boston Public Library
Reference Room
666 Boylston Street
Boston, MA 02116

Re: Phase II Comprehensive Site Assessment
1575 VFW Parkway
West Roxbury, MA
RTN's 3-2126 & 3-14019

To Whom It May Concern:

IES, Inc. of Somerville, MA has completed a "Phase II Comprehensive Site Assessment" for the above referenced location. The purpose of this Phase II Report is to document information obtained as a result of Comprehensive Site Assessment activities and support the conclusions and opinions based upon the findings of the assessment. Finally, an MCP Method 1 Risk Assessment was also performed as part of the Phase II investigation.

The conclusion of the Phase II report is that "Comprehensive Response Actions are necessary at the site to achieve a Response Action Outcome as described in 310 CMR 40.1000". Therefore, a Phase III study is required for the identification, evaluation and selection of Comprehensive Remedial Action Alternatives as described in 310 CMR 40.0850.

Pursuant to 310 CMR 40.1405(6), a copy of the Phase II report is being submitted to the Boston Public Library in order to allow for public review of this report prior to the initiation of any response actions.

If you have any questions regarding this matter, please do not hesitate to contact our office.

Respectfully submitted,
IES, INC.

Daniel G. Jaffe, LSP (#2347)
President

IES OF CONNECTICUT: MILLION AIR • BRAINARD AIRPORT • HARTFORD, CT 06114 • (860) 724-1020

IES OF MASSACHUSETTS: 265 MEDFORD ST. • SOMERVILLE, MA 02143 • (617) 623-8880

IES OF NEW HAMPSHIRE: 460 WEST MAIN STREET • HILLSBOROUGH, NH 03244 • (603) 641-6173

IES OF NEW YORK: 10 DICKERSON AVENUE • BAYVILLE, NY 11709 • (516) 420-9518



I E S, INC.

ENVIRONMENTAL CONSULTANTS

265 MEDFORD ST. • SOMERVILLE, MA 02143

(617) 623-8880 • FAX # (617) 629-2920

IESINC@AOL.COM

Direct Dial Numbers

David P. Borans: (617) 776-8549

Cosmo D. Capobianco: (671) 623-8883

Kerry Asetta: (617) 776-0578

David Brincheiro: (617) 776-1950

John R. DiPietro: (617) 623-6204

Gerard R. Goguen: (617) 623-5158

Daniel G. Jaffe: (617) 776-2715

February 2, 1999

Mr. Rosario Boisvert
Saturn Central
151 Rivermoor Street
West Roxbury, MA 02132

Re: IES Project #797-159
Phase II Site Assessment
1575 VFW Parkway
West Roxbury, MA
RTN's 3-2126 & 3-14019

Dear Mr. Boisvert:

As requested, and in accordance with the Terms of our Contract, IES, Inc. has conducted a Phase II Comprehensive Site Investigation as defined in 310 CMR 40.0830 for the above referenced property. The purpose of this Phase II Report is to document information obtained from Comprehensive Site Assessment activities and to support the conclusions and opinions based upon the findings of the assessment. Finally, a MCP Method 1 Risk Characterization was also performed as part of the Phase II investigation.

The following is our **Executive Summary**, which details the major findings of the report:

1. This Phase II Report and associated Risk Characterization were performed in accordance with 310 CMR 40.0835, and includes general disposal site information, disposal site history, site hydrogeological characteristics, the nature and extent of contamination, environmental fate and transport, an exposure assessment, and a risk characterization. Several subsurface investigations, including test borings, soil sample screening, and laboratory analysis of soil and groundwater samples was also performed as part of this and previous investigations, and the information obtained from these programs was utilized in the Phase II Assessment.
2. The subject site consists of one, relatively flat, irregularly-shaped parcel of land located on the Veterans of Foreign Wars (VFW) Parkway (Route 1), in the West Roxbury Section of Boston, Massachusetts. The site is located in a mixed commercial and residential area of West Roxbury, and is zoned for commercial use. The subject site contains a total area of 138,452 square feet, and is occupied by a one-story brick and metal building, which is used by a used car dealership and repair garage; and a one-story concrete block building, which is utilized as an automobile dealership (Audi/Mercedes) and associated automotive repair garage.

The site was originally developed with the existing buildings in 1968, and the site has been utilized as an automobile dealership since that time. Prior to 1968 the subject site was vacant and undeveloped, and consisted of a wetland area associated with the nearby Charles River.

IES OF CONNECTICUT: MILLION AIR • BRAINARD AIRPORT • HARTFORD, CT 06114 • (860) 724-1020

IES OF MASSACHUSETTS: 265 MEDFORD ST. • SOMERVILLE, MA 02143 • (617) 623-8880

IES OF NEW HAMPSHIRE: 460 WEST MAIN STREET • HILLSBOROUGH, NH 03244 • (603) 641-6173

IES OF NEW YORK: 10 DICKERSON AVENUE • BAYVILLE, NY 11709 • (516) 420-9518

SECTION I

SECTION II

SECTION III

SECTION IV

SECTION V

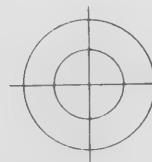
SECTION VI

3. Contamination was discovered at the site during a tank removal program, which was performed by Zecco, Inc. of Northborough, MA on August 1, 1988. According to information obtained at the DEP, a letter from Zecco indicated that two, 2,000 gallon underground waste oil tanks were removed from one excavation, and were leaking.

The DEP was notified of this release (Spill No. N88-1121), and as a result, a Notice of Responsibility (NOR) was issued to Clair Motors on August 26, 1988. Subsequently, a Preliminary Assessment (PA) form was completed by Zecco, and submitted to the DEP on March 3, 1989. The site was listed as a Location to be Investigated (LTBI) on April 15, 1989 (RTN 3-2126).

As a result of this release, a total of 100 cubic yards of contaminated soil were transported to the Consolidated Waste Services facility in Norridgewock, ME on December 7, 1988. A letter written by Zecco, Inc. dated September 9, 1988 stated that "all contaminated soil was removed from the pit down to the groundwater table". Laboratory analysis of a soil sample obtained from the excavation by Zecco indicated a TPH concentration of 12,757.3 mg/kg, and laboratory analysis of a groundwater sample obtained from the excavation indicated a TPH concentration of 300 mg/l.

4. Subsequently, a subsurface soil and groundwater sampling and analysis program was conducted at the site by IES, Inc. on July 17, 1996 as part of a Phase I investigation, and consisted of the advancement of six (6) test borings (B-1 through B-6), and the installation of monitoring wells in each of the borings. Soil sample screening performed during the test boring program indicated the presence of elevated levels of VOC's (up to 155 ppm) in soil samples obtained from all six of the borings advanced at the site. In addition, during the groundwater sampling program separate-phase product (waste oil) was detected in the monitoring wells installed in borings B-1 (2.65 feet), B-2 (1.60 feet), and B-4 (1.90 feet). The presence of this separate-phase product resulted in DEP notification of a "72-Hour" condition (RTN 3-14019).
5. Due to the presence of separate-phase product, Cyn Environmental Services, Inc. of South Boston, MA excavated two trenches, and installed individual 10 inch recovery wells in each of the trenches on July 31 and August 1, 1996 as an Immediate Response Action (IRA). A total of approximately 40-50 cubic yards of waste oil contaminated soil was excavated and stockpiled at the site as part of the IRA, and a total of approximately 2,250 gallons of product (oil/water mixture) was pumped from the trenches by Cyn Environmental Services, as part of the IRA on July 31 and August 1, 1997, and a total of 705 gallons of separate-phase product has been pumped from the recovery wells since that time.
6. As part of a Release Abatement Measure (RAM) currently operating at the site, a bioremediation program, which was described in detail in several previous submittals by IES, began operating in April of 1997, and has been operating since that time. In addition, a total of 114 tons of waste oil contaminated soil was excavated and removed from the site as part of a RAM addendum in October of 1998, and approximately 2,000 gallons of contaminated



IES, INC.

groundwater was pumped from the excavation at that time. RAM Status reports have been submitted to the DEP every six months since the initiation of the RAM.

7. Finally, a "Risk Characterization" for the subject site was completed by IES as part of this Phase II investigation. This risk assessment included Hazard Identification, Exposure Assessment, a Characterization of Risk of Harm to Human Health, and an Uncertainty Analysis. The conclusion of the Risk Assessment is that a condition of No Significant Risk to health and public welfare **has not yet been achieved at the site**, based upon exceedances of Method 1 Risk Characterization standards in the soil and groundwater as detailed in this report, as well as the presence of separate-phase product in monitoring well B-10.

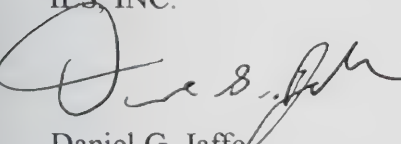
The Risk Characterization also concluded that a condition of No Significant Risk to Safety **does exist at the site**; and a condition of No Significant Risk to the Environment **does exist at the site**, based on a Stage I Screening. In summary, the overall conclusion of the Risk Characterization is that a condition of No Significant Risk to health and public welfare **has not been achieved** at the subject site.

8. Based on the information contained in this report, as well as 310 CMR 40.0840(1), the conclusion of this report is that "Comprehensive Response Actions are necessary at the site to achieve a Response Action Outcome as described in 310 CMR 40.1000". Therefore, a Phase III study is required for the identification, evaluation and selection of Comprehensive Remedial Action Alternatives as described in 310 CMR 40.0850. As part of this Phase II Comprehensive Site Assessment, a Comprehensive Response Action Transmittal Form & Phase I Completion Statement (BWSC-108), has been completed pursuant to 310 CMR 40.0836. A copy of this form is included under separate cover.

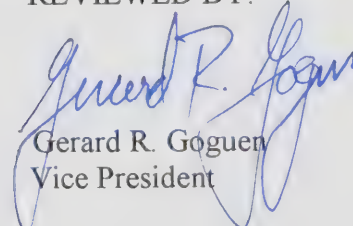
Furthermore, if additional data becomes available, or related quantitative or qualitative analysis is performed, IES should review the material to determine if the conclusions in this report should be modified.

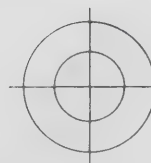
Respectfully submitted,

IES, INC.


Daniel G. Jaffe
President

REVIEWED BY:


Gerard R. Goguen
Vice President



IES, INC.

SECTION I

SECTION II

SECTION III

SECTION IV

SECTION V

SECTION VI

SECTION I

SECTION I

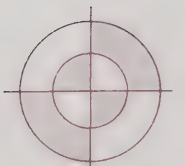
SECTION II

SECTION III

SECTION IV

SECTION V

SECTION VI



SECTION I

SECTION I
SITE SPECIFICS

General Disposal Site Information

Disposal Site Name:	Clair Motors
Release Tracking #'s:	3-2126 & 3-14019
Site Address:	1575 VFW Parkway Boston (West Roxbury), MA
County:	Suffolk
Latitude & Longitude:	42° 16' 32" 71° 10' 25"
UTM Coordinates:	4,681,100 N 321,000 W
Site Owner:	Clair Motors 1575 VFW Parkway West Roxbury, MA 02132
Zoning:	Commercial
Assessor's Map/Lot:	20343/10643-2
USGS Topographic Quadrangle:	Boston South, MA
FEMA Flood Map:	Panel #250286 0013C
Estimated Number of On-Site Workers:	100-999
Estimated Residential Population - 0.5 Miles:	100-999
Number of Institutions Within 500 Feet:	0

SECTION II

SECTION III

SECTION IV

SECTION V

SECTION VI

The subject site consists of one, relatively flat, irregularly-shaped parcel of land located on the Veterans of Foreign Wars (VFW) Parkway (Route 1), in the West Roxbury Section of Boston, Massachusetts. The site is located in a mixed commercial and residential area of West Roxbury, and is zoned for commercial use.

According to the USGS Boston South, MA Quadrangle topographic map, the site is situated approximately 20 feet above mean sea level, as shown in **Attachment "A", Figure 1**. The subject site is identified on City of Boston Assessor's Map #20343 as Lot #10643-2, as shown in **Attachment "A", Figure 2**. The site in question is located approximately 200 feet to the northeast of the Dedham Town line (Norfolk County). The nearest body of surface water is the Charles River, which is abuts the subject site to the southwest.

The "Disposal Site" for the purposes of this investigation is located between the two automobile dealership/automotive repair buildings on the northern side of the property, and extends to a paved parking lot, which is located to the west of the buildings. The source of contamination at the site was the two former 2,000 gallon underground waste oil tanks, which were located between the buildings. The Disposal Site is identified on Figure 3 in **Attachment "A"** at the end of this report, and the location of the former underground waste oil tanks is shown on this plan.

The subject site contains a total area of 138,452 square feet, and is occupied by a one-story brick and metal building, which is used by a used car dealership and repair garage; and a one-story concrete block building, which is utilized as an automobile dealership (Audi/Mercedes) and associated automotive repair garage. The existing buildings occupied approximately 30 percent of the property, and remainder is paved for parking and access. No vegetation was observed on the site at the time of the site inspection.

The site was originally developed with the existing buildings in 1968, and the site has been utilized as an automobile dealership since that time. Prior to 1968 the subject site was vacant and undeveloped, and consisted of a wetland area associated with the nearby Charles River.

The subject site appears to be located in both "Zone A5" and "Zone B" according to the Federal Emergency Management Agency (Community Panel 250286 0013C). The eastern side of the site is located in "Zone A5", which is an area of 100 year floods; and the western portion of the site is located in "Zone B", which is an area between the limits of the 100 year and 500 year floods.

The site is serviced with municipal water and sewer, which enter the property from VFW Parkway. In addition, the buildings at the site are currently heated with natural gas, which also enters the site from VFW Parkway.

The Disposal Site is abutted to the north by a residential trailer park, and to the east by VFW Parkway (Route 1). The area to the east of the site, across VFW Parkway is occupied by an automotive repair garage (Firestone) and a truck rental facility (U-Haul). The site is abutted to the west by the Charles River, and to the south by an automobile dealership (Clair Used Cars), also at 1575 VFW Parkway.

Other than the northerly abutting residential trailer park, the area surrounding the site is predominantly commercial, consisting of a variety of businesses along VFW Parkway. Nearby businesses include retail stores, restaurants, and automobile dealerships. There are no schools or hospitals located within a 500 foot radius of the subject site.

The following information is contained in a DEP Bureau of Waste Site cleanup Site Scoring Map, the Boston South, MA quadrangle USGS topographic map, which is included in **Attachment "A"**.

- Potentially Productive Medium Yield Aquifers.
- Potentially Productive High Yield Aquifers.
- Medium Yield Aquifers NOT Classified as Potentially Productive.
- High Yield Aquifers NOT Classified as Potentially Productive.
- Potentially Productive Sole Source Aquifers.
- DEP Approved Wellhead Protection Areas - Zone 2.
- Interim Wellhead Protection Areas.
- Public Surface Water Supplies.
- Lakes, Ponds, and Surface Water Features.
- Bays, Estuaries, and other Salt Water Features.
- Fresh Water Non-Forested Wetlands.
- Salt Water Wetlands.
- State, Federal, Municipal, Nonprofit, and Private Open Spaces and Recreational Facilities.

- Areas of Critical Environmental Concern.
- DEP Permitted Solid Waste Facilities.
- NHESP Estimated Habitats of Rare wetlands Wildlife 1993 - For use with Wetlands Protection Act ONLY.
- Zones of Contribution.
- Public Water Supplies - Groundwater.
- Public Water Supplies - Surface Water.
- Non-Community Public Water Supplies.
- Certified Vernal Pools.

The above information lists what items can be addressed in a Site Scoring Map. the specific items shown at and in the vicinity of the subject site are indicated as follows:

1. The western side of the subject site is located in a "NOT Potentially Productive Medium Yield Aquifer".
2. The area immediately to the west of the site is located in a "NOT Potentially Productive High Yield Aquifer".
3. The area located approximately 500 feet to the west of the site, on the opposite side of the Charles River, and the area located approximately 1,000 feet to the south of the site are identified as a "High Yield Potentially Productive Aquifer".
4. The area located approximately 500 feet to the southwest of the site, across the Charles River is also identified as "Fresh Water Non-Forested Wetlands".
5. The area located approximately 1,000 feet to the west of the site, and the area located approximately 1,000 feet to the south of the site are identified as a "Potentially Productive Medium Yield Aquifer".
6. The area located nearly 0.5 miles to the north of the site is identified as "State, Federal, Municipal, Nonprofit and Private Open Space and Recreational Facilities".
7. The nearby Charles River is identified as "Lakes, Ponds, Other Fresh Water Features".

No other features shown on the Bureau of Waste Site Cleanup "Site Scoring Map" were identified within 0.5 miles of the subject site.

The MassGIS/BWSC "Priority Resources Map" for the Boston South, MA quadrangle was also reviewed in order to confirm the information contained in the Site Scoring Map. The sources of the information utilized in the Site Scoring Map are included in **Attachment "B"**.

B. Disposal Site Map

Disposal Site Maps showing site boundaries, on-site buildings, storm drains, subsurface utilities, hazardous material storage areas, locations of oil and hazardous materials releases, monitoring wells, and test borings, are included as Figures 3 and 4 in **Attachment "A"**.

SECTION II

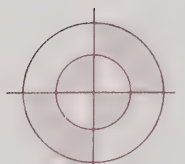
SECTION II

SECTION III

SECTION IV

SECTION V

SECTION VI



SECTION I

SECTION II

SECTION II

DISPOSAL SITE HISTORY

A. Disposal Site History

Information regarding the history of the subject site was obtained from previous reports produced for the site, including a "Phase I Site Assessment" reported dated August 2, 1996 by IES, Inc. Informational sources and references are listed in **Attachment "B"**.

These sources revealed that the existing buildings at the site were constructed in 1968 for use as automobile dealerships (Clair Motors), and have been utilized as such since that time. Prior to the construction of the existing buildings in 1968, the site was vacant, and consisted of wetlands associated with the Charles River. There is no record of any development of the subject site prior to 1968.

B. Release History

Two separate releases have been reported at the site (RTN's 3-2126 and 3-14019), which are summarized in the following Table 1:

Table 1
Summary of On-Site Releases

RTN 3-2126	Reporting Date	August 1, 1988 (Spill No. N88-1121)
	Source of Release	Two, 2,000 gallon underground waste oil tanks
	Location of Release	Between two dealership buildings & parking lot
	Cause of Release	Leaks from underground tanks
	Date & Duration of Release	Unknown
	Type of OHM Released	Waste Oil
	Volume of Release	Unknown
	Measures Taken	Soil Removal (Short Term Measure in 1988, IRA in 1996, and RAM Addendum in 1998); Product Recovery (IRA in 1996-1997), and ongoing bioremediation program (RAM from 1997 to present)

Table 1 (continued)

RTN 3-10645	Reporting Date	July 23, 1996
	Source of Release	Two, 2,000 gallon underground waste oil tanks
	Location of Release	Between two dealership buildings & parking lot
	Cause of Release	Leaks from underground tanks
	Date & Duration of Release	Unknown
	Type of OHM Released	Waste Oil
	Volume of Release	Unknown
	Measures Taken	Soil Removal (Short Term Measure in 1988, IRA in 1996, and RAM Addendum in 1998); Product Recovery (IRA in 1996-1997), and ongoing bioremediation program (RAM from 1997 to present)

Contamination was discovered at the site during a tank removal program, which was performed by Zecco, Inc. of Northborough, MA on August 1, 1988. According to information obtained at the DEP, a letter from Zecco indicated that two, 2,000 gallon underground waste oil tanks were removed from one excavation, and were leaking. A third 2,000 gallon waste oil tank was removed from a separate excavation, and there was no evidence of a release at that time, according to Zecco.

The DEP was notified of this release (Spill No. N88-1121), and as a result, a Notice of Responsibility (NOR) was issued to Clair Motors on August 26, 1988. Subsequently, a Preliminary Assessment (PA) form was completed by Zecco, and submitted to the DEP on March 3, 1989. The site was listed as a Location to be Investigated (LTBI) on April 15, 1989 (RTN 3-2126).

In response to the NOR, a letter was written by Zecco, Inc. dated September 9, 1988 which stated that "all contaminated soil was removed from the pit down to the groundwater table". Laboratory analysis of a soil sample obtained from the excavation by Zecco indicated a TPH concentration of 12,757.3 mg/kg, and laboratory analysis of a groundwater sample obtained from the excavation indicated a TPH concentration of 300 mg/l. Copies of hazardous waste manifests on file with the DEP indicate that a total of 100 cubic yards of contaminated soil were transported to the Consolidated Waste Services facility in Norridgewock, ME on December 7, 1988. No other information or testing results were on file at the DEP or available from the PRP regarding this release.

Subsequently, a subsurface soil and groundwater sampling and analysis program was conducted at the site by IES, Inc. on July 17, 1996 as part of a Phase I investigation, and consisted of the advancement of six (6) test borings (B-1 through B-6), and the installation of monitoring wells in each of the borings. The location of the site is shown in Figures 1 and 2 in **Attachment "A"**, and the locations of the monitoring wells at the site are shown in Figure 3 in **Attachment "A"** at the end of this submittal.

Boring B-1 was advanced in an area approximately 50 feet to the west, and down gradient of the area of the former underground waste oil tanks (removed in 1988), which were the source of the contamination at the site. Borings B-2, B-3, and B-4 were located in the area of the former underground waste oil tanks, and borings B-5 and B-6 were placed in areas several hundred feet to the west, and down gradient of the former tanks.

Soil sample screening performed during the test boring program indicated the presence of elevated levels of VOC's (up to 155 ppm) in soil samples obtained from all six of the borings advanced at the site. In addition, during the groundwater sampling program separate-phase product (waste oil) was detected in the monitoring wells installed in borings B-1 (2.65 feet), B-2 (1.60 feet), and B-4 (1.90 feet). The presence of this separate-phase product (waste oil) resulted in DEP notification of this 72-Hour condition (**RTN 3-14019**). No measurable product was noted on the groundwater samples obtained from the other three monitoring wells at the site (B-3, B-5, and B-6). Due to the presence of the separate-phase product, an Imminent Hazard Evaluation in accordance with 310 CMR 40.0426 was conducted at the subject site, and was previously submitted to the DEP.

The Imminent Hazard Evaluation was performed by IES in April of 1997, and concluded that "the release conditions specified in 310 CMR 40.0321(2) and/or 40.0321(3) do not constitute an actual Imminent Hazard to human health in conformance with the Imminent Hazard Evaluation process described in 310 CMR 40.0426, and in consideration of the site specific factors and risk assessment and risk management criteria contained in 310 CMR 40.0950". This report also concluded that a Substantial Release Migration has not been identified at the site. The Imminent Hazard Evaluation was previously submitted to the DEP.

On July 31 and August 1, 1996, Cyn Environmental Services, Inc. of South Boston, MA excavated two trenches, and installed individual 10 inch recovery wells in each of the trenches (see Figure 3 in **Attachment "A"**). Recovery well RW-1 was installed on the down gradient side of the area of contamination, adjacent to boring B-1; and recovery well RW-2 was installed in the area of the former underground waste oil tanks (the source of the contamination), adjacent to boring B-2. The trench associated with RW-1 was advanced to a depth of approximately eight feet, extended to a length of approximately 15 feet, and to a width of approximately three feet. The trench associated with RW-2 was also advanced to a depth of approximately eight feet, extended to a length of approximately 20 feet, and to a width of approximately four feet. Peastone was used to fill in the base of the trenches around the slotted piping of the recovery well, and clean gravel was used as fill material for the portions of the trenches above the groundwater table.

A total of approximately 40-50 cubic yards of waste oil contaminated soil was excavated and stockpiled at the site as part of the IRA, and a total of approximately 2,250 gallons of product (oil/water mixture) was pumped from the trenches by Cyn Environmental Services, as part of the IRA on July 31 and August 1, 1997, and a total of 705 gallons of separate-phase product has been pumped from the recovery wells since that time.

Copies of the hazardous waste manifests for the disposal of the oil/water and a copy of the bill of lading for the disposal of the contaminated soil were previously submitted to the DEP, along with IRA Completion Statement and RAM Status Reports.

SECTION III



SECTION III

SITE HYDROGEOLOGIC CHARACTERISTICS

A. Site Topography

According to 314 CMR 40.5, Figure B: "Commonwealth of Massachusetts River Basins and Coastal Drainage Areas", the site is located in the Charles River Drainage Basin. The site is relatively flat, and slopes gently downward to the west, toward the Charles River. No bedrock outcrops were observed at the site or in the immediate vicinity.

B. Site Geology

The actual bedrock geology at the site was not identified during this investigation. However, according to the "Bedrock Geologic Map of Massachusetts" (Zen, 1983), bedrock at the site has been identified as Roxbury Conglomerate (Proterozoic Z to earliest Paleozoic). The bedrock is comprised of conglomerate, sandstone, siltstone argillite, and melaphyre.

The surficial geology of the site was observed during the test boring programs performed by IES in July of 1996 and December of 1998. During the test boring programs, the surficial geology of the site was observed to contain a layer of sand, gravel and stones from the surface to depths ranging from seven to nine feet. Below this material, the geology consisted of dense, medium grained sand and gravel to a total depth of nine to twelve feet. Similar geology was noted during the installation of the groundwater recovery wells as part of an IRA in July of 1996; during the soil excavation and removal program performed as part of a RAM in October of 1998.

C. Test Boring Documentation

Test borings were advanced at the site in July of 1996 (B-1 through B-6) by Carr Dee Corp. of Medford, MA and were inspected by IES personnel (see **Attachment "C"** for IES Standard Operating Procedures for Test Borings and Monitoring Wells). Test boring logs produced during the subsurface exploration program performed by IES in July of 1996 are included in **Attachment "D"** of this report.

The borings were advanced at the site by Carr Dee Corp. of Medford, MA under the supervision of IES personnel. The borings were advanced to depths ranging from 9.0 to 12.0 feet using a 4.25 inch diameter hollow-stem auger and a truck mounted drilling rig. The monitoring wells installed by Carr Dee Corp. consisted of two inch diameter schedule 40 PVC pipe, which were screened for the entire length of the boring due to the shallow groundwater table, and in order to allow for seasonal groundwater fluctuations. The annular space around the well screens was backfilled with clean Ottawa silica, and a one to two foot bentonite seal was placed one foot above the top of each screen. A bolted, protective road box was placed over each well, and sealed with concrete to grade.

A total of five geoprobes (B-7 through B-11) were advanced at the site in December of 1998 by Technical Drilling Services Inc. (TDS) of Leominster, MA in order to further delineate the extent of the release. The samples were collected using a truck mounted, percussion hammer driving system. The core samples were collected at continuous depths in four foot intervals from the surface to depths ranging from 10 to 16 feet using a 1 ³/₈" diameter stainless-steel sampling tube. A clear acetate liner was placed within the sampling tube prior to the collection of each sample, and advanced to the desired depth. All sampling equipment was decontaminated with clean water and detergent, and a new liner was placed in the sampling tube prior to the collection of the next sample. Each sample was removed from the liner and placed into pre-cleaned 8 oz. jars for headspace screening and laboratory analysis.

The monitoring wells installed by TDS consisted of one inch diameter schedule 40 PVC pipe, which were screened for the entire length of the boring due to the shallow groundwater table, and in order to allow for seasonal groundwater fluctuations. The annular space around the well screens was backfilled with clean Ottawa silica, and a one to two foot bentonite seal was placed one foot above the top of each screen. A bolted, protective road box was placed over each well, and sealed with concrete to grade.

D. Groundwater Flow

A groundwater flow survey was performed at the site by IES as part of the previously submitted Phase I investigation. The groundwater depths were measured from the top of the well casing with a portable electronic water level indicator (accurate to 0.01 inches). The wells were then surveyed relative to a permanent benchmark, which was assumed to be at an arbitrary elevation of 100.00 feet above mean sea

level. The water table elevation at each well was then calculated in order to provide data points needed to produce a groundwater contour map.

The results of this survey indicated that the groundwater flow direction at the site is to the west, toward the nearby Charles River. However, based on the groundwater elevations, "mounding" in the areas of three of the monitoring wells (B-1, B-2, and B-4), appears to have occurred due to the presence of separate-phase product during the initial round of sampling in July of 1996. This mounding was not apparent in those wells during subsequent rounds of sampling, although the presence of 8.2 inches of separate-phase product in B-10 was noted. Groundwater elevations, the locations of the monitoring wells, and a graphical depiction of the groundwater flow direction are included in Figure 3 in **Attachment "A"** at the end of this report. The following Table 2 shows the groundwater table elevations.

Table 2
Groundwater Elevations

Well #	Well Elevation (feet)	Depth (feet)	Groundwater Elevation (feet)
B-1	96.94	6.63	89.83
B-2	96.90	6.85	90.05
B-3	96.88	6.86	90.02
B-4	97.20	7.61	89.59
B-5	94.44	5.07	89.37
B-6	93.18	3.68	89.50

Notes: All depths are in feet
Benchmark = 100' (fire hydrant on VFW Parkway)

Based on this information, the water table is inferred to slope generally to the west, towards the Charles River at a slight grade of order 0.0001 to 0.003. Therefore, utilizing Darcy's Law and the available estimates of hydraulic conductivity and gradient, groundwater at the site was expected to migrate at a rate of order of one to twenty feet per year. This is less than expected based on the type of soil present at the site, but may be due to the viscous nature of waste oil. However, it should also be noted that an underground sewer line runs from south to north at a location approximately 10-20 feet to the west of boring B-10. This sewer line may inhibit the contaminant flow, which may have contributed to the presence of separate-phase product in that area.

SECTION IV

SECTION IV

SECTION V

SECTION VI



SECTION I

SECTION II

SECTION III

SECTION IV

SECTION IV

ENVIRONMENTAL FATE & TRANSPORT

A. Fate & Transport/Migration Pathways

Potential contamination migration pathways of contaminants at the site were identified and characterized for the following media: air, soil, groundwater, surface water, and sediment. The environmental fate and transport of the contaminants of concern for the site are discussed as follows:

Waste Oil: Contamination resulting from a release of waste oil from underground storage tanks located between two automobile dealership buildings has been detected in the soil and groundwater at the site. Migration of the waste oil progressed vertically downward through the vadose zone until the water table was encountered, at which point it spread laterally through the groundwater. Due to the low volatility of the primary constituents of waste oil and the low levels of VOC's detected, as well as the fact that both of the buildings at the site do not have basements and are comprised of a large open areas, these contaminants do not present a significant source of vapors to indoor air.

Contaminants associated with the waste oil release have been detected above Method 1 Standards GW-2 and/or GW-3 Standards in groundwater samples obtained from monitoring wells B-1, B-2, B-4, B-5, B-6, B-7, B-9, and B-10, all of which are located directly down gradient of the former underground waste oil tanks, which were the source of the contamination. It should be noted that no VOC's or PAH's were detected in monitoring wells B-5 and B-6 during the most recent round of testing (July 1998), and the EPH and VPH constituents detected were present at levels well below the applicable MCP Method 1 GW-2 and GW-3 Standards. These monitoring wells are located over 100 feet from the source of the contamination, and the levels of contamination have decreased since the completion of the IRA, which removed separate-phase product from the groundwater. No surface water bodies or sediments are located within 300 feet of the remaining monitoring wells, and due to the recent soil removal program (October 1998), and the ongoing bioremediation program, the contaminant plume is not likely to impact surface water or sediments in the near future.

The EPH, VPH, VOC's, and PAH's detected in the soil and groundwater in conjunction with the waste oil release will travel with groundwater flow across the site. However, as previously discussed, these compounds were detected at elevated concentrations only within 100 feet of the source. Therefore, the current degree of groundwater transport of the contaminants associated with the waste oil release appears to be minimal, and the presence of an underground sewer line may also act to inhibit or alter contaminant flow.

B. Contaminant Information

The initial subsurface investigation was performed at the site by IES in July of 1996 as part of a "Phase I" investigation in order to determine the degree of contamination, and delineate its horizontal and vertical extent. This information was subsequently utilized in the completion of an LSP Opinion Transmittal Form (BWSC-110), and Tier Classification (Tier 2) for the subject site, which were previously submitted to the DEP on August 2, 1996.

This program consisted of the advancement of six (6) test borings (B-1 through B-6), and the installation of monitoring wells in each of the borings. This program also included soil sample screening and laboratory testing of soil and groundwater samples. The locations of the monitoring wells at the site are shown in Figure 3 in **Attachment "A"**, and the results of the testing programs performed on soil and groundwater samples obtained from these borings/monitoring wells are summarized later in this report.

Boring B-1 was advanced in an area approximately 50 feet to the west, and down gradient of the area of the former underground waste oil tanks, which were the source of the contamination at the site. Borings B-2, B-3, and B-4 were located in the area of the former underground waste oil tanks, and borings B-5 and B-6 were placed in areas several hundred feet to the west, and down gradient of the former tanks, in order to delineate the extent of the contamination.

Soil samples were obtained at regular five foot intervals during the test boring program. the soil samples obtained from the test boring program were screened with a ThermoEnvironmental Model 580B Photoionization Meter to detect the presence of Volatile Organic Compounds (VOC's) in the soil headspace. The results of the soil sample screening indicated the presence of elevated levels of VOC's

(up to 155 ppm) in soil samples obtained from all six of the borings advanced at the site. The results of the soil sample screening program are summarized in Table 6 on page 23 of this report, and test boring logs are included in **Attachment "D"** of this report.

Due to the elevated headspace readings noted during the soil sample screening program, the soil samples containing the highest HNU reading from each of the six test borings were forwarded to Thermo Analytical Laboratories, Inc. (TMA) of Waltham, MA for analysis. The sample with the highest headspace reading overall (B-2/S-2) was tested by TMA for VOC's by EPA Method 8260, and for TPH by EPA Method 8100. The remaining soil samples were tested for VOC's by EPA Method 8020, and for TPH by EPA Method 418.1. The results of this testing are summarized in the following Table 3 of this report, test boring logs are included in **Attachment "D"**, and laboratory reports and the chain-of-custody are included in **Attachment "E"** of this report.

Table 3

Summary of Soil Testing Results – July 1996

Sample ID:	B-1/S-3	B-2/S-2	B-3/S-1	B-4/S-3	B-5/S-3	B-6/S-2	Method 1 S-1/GW-3
Sample Depth (feet):	10-12	5-7	0.5-2.5	10-12	10-12	5-7	N/A
Headspace (ppm)	97	155	68	81	85	61	NE
TPH (mg/kg)	1,480	22,100	3,010	642	9,670	11,800	800
VOC's (µg/kg)							
Benzene	ND	190	48	ND	25	37	40,000
Ethylbenzene	19	8,000	240	53	240	7.0	500,000
Toluene	2.8	6,700	780	4.5	31	9.4	500,000
Xylenes	450	48,000	1,920	273	2,170	152	500,000
1,4-Dichlorobenzene	2.4	ND	ND	ND	9.6	2.3	40,000
1,2-Dichlorobenzene	2.9	ND	ND	1.8	ND	ND	100,000
Acetone	NT	320	NT	NT	NT	NT	60,000
Chloroform	NT	29	NT	NT	NT	NT	10,000 ¹
Methylene Chloride	NT	62	NT	NT	NT	NT	100,000
Naphthalene	NT	850	NT	NT	NT	NT	100,000
1,1,1-Trichloroethane	NT	37	NT	NT	NT	NT	100,000
Trichloroethene	NT	22	NT	NT	NT	NT	20,000 ¹
n-Propylbenzene	NT	830	NT	NT	NT	NT	NE
Sec-Butylbenzene	NT	86	NT	NT	NT	NT	NE
Ethyl Methacrylate	NT	510	NT	NT	NT	NT	NE
Isopropylbenzene	NT	270	NT	NT	NT	NT	NE
p-Isopropyltoluene	NT	180	NT	NT	NT	NT	NE
1,2,4-Trimethylbenzene	NT	2,100	NT	NT	NT	NT	NE
1,3,5-Trimethylbenzene	NT	1,300	NT	NT	NT	NT	NE
Total C₉-C₁₀ VOC's²	N/A	5,276	N/A	N/A	N/A	N/A	100,000

Notes: NE = None Established

1 = The S-1/GW-2 and GW-3 Standards are identical for every compound listed except Chloroform and Trichloroethene, where the S-1/GW-2 Standard is listed in the table.

2 = VOC's with no individual Method 1 Standards are combined and compared to the Method 1 C₉-C₁₀ Aromatics Standard.

Bold indicates level exceeds Method 1 Standards

As detailed in the Risk Characterization, which is included with this report, the combined concentrations of n-Propylbenzene, sec-Butylbenzene, Isopropylbenzene, p-Isopropyltoluene, 1,2,4-Trimethylbenzene, and 1,3,5-Trimethylbenzene can be compared to the Method 1 Standards for C₉-C₁₀ Aromatics, as there are no Method 1 Standards or MCL's for any of these compounds. Isopropylbenzene, n-Propylbenzene, 1,3,5-Trimethylbenzene, 1,2,4-Trimethylbenzene are C₉ Aromatics; and sec-Butylbenzene, and p-Isopropyltoluene are C₁₀ Aromatics.

Ethyl Methacrylate is commonly known as "plexiglass", and is used to make polymers. The presence of this compound is attributed to laboratory or sampling error, and is not considered representative of actual site conditions. Finally, it should also be noted that Ethyl Methacrylate was detected at a level of approximately one percent of the RCS-1 Standard of 500,000 µg/kg, and therefore, even if present from another source, it is not considered to pose a threat to the subject site.

As shown in the above Table 3, the levels of TPH exceeded the MCP Method 1 S-1/GW-2 and S-1/GW-3 Standards in five of the six samples tested (all except B-4/S-3). However, it should be noted that this testing was performed prior to the use of EPH/VPH methodology, and therefore, the actual levels of individual petroleum constituents may actually be below Method 1 Standards any of these samples. No VOC's were detected, above Method 1 Standards in any of the samples tested.

On July 22, 1996 the monitoring wells installed in borings B-1 through B-6 were purged of approximately three volumes of standing water to ensure that the sample were representative of the aquifer (see **Attachment "D"** for test boring logs). It should be noted that at the time of the groundwater sampling program, separate-phase product in excess of 0.5 inches (up to 2.65 feet) was measured on the groundwater in three of the wells (B-1, B-2, and B-4), which resulted in DEP notification of this 72 Hour reporting condition (RTN 3-14019).

Groundwater samples were obtained from the monitoring wells with dedicated, disposable PVC bailers. The groundwater samples were preserved according to EPA guidelines published in 40 CFR 136, and immediately forwarded to TMA for testing. Groundwater samples obtained from the monitoring well installed in boring B-2 were tested for VOC's by EPA Method 8240, and for TPH by EPA Method 8100. Groundwater samples obtained from the monitoring wells installed in the other borings at the site were tested for VOC's by EPA Method 8020, and for TPH by EPA Method 418.1.

The results of the groundwater testing program indicated that elevated levels of several VOC's and TPH were detected in groundwater samples obtained from all six monitoring wells at the site. The levels of TPH in B-1, B-2, and B-4 exceeded the then applicable MCP Method 1, GW-2 and/or GW-3 standards of 50 mg/l. In addition, the levels of Benzene, Toluene, Ethylbenzene, and Xylenes (BTEX) exceed the Method 1, GW-2 and GW-3 standard in groundwater samples obtained from B-2; and Toluene,

Ethylbenzene, and Xylenes exceed the MCP Method 1 GW-2 and GW-3 standards in the groundwater samples obtained from B-1.

Subsequent laboratory testing of groundwater samples obtained from these wells as part of RAM Status reports indicates that there has been a general decrease in the levels of contamination present in these monitoring wells. Laboratory results from sampling performed from 1996 through 1998 are summarized in Tables 7 through 13 of this report, and laboratory reports and Chains-of-Custody are included in **Attachment "E"** of this report.

A second subsurface exploration program (geoprobos) was performed at the site by IES in December of 1998, which included the advancement of five geoprobos (B-7 through B-11), and the installation of monitoring wells in all five geoprobos. In addition, soil sample screening was performed along with a soil and groundwater sampling and analysis program.

Borings B-7, B-9, and B-10 are located down gradient of the former underground waste oil tanks, which were the source of the contamination; and borings B-8 and B-11 are located cross gradient of the former UST location. Boring B-8 was placed on the northern property boundary in order to determine if the release has migrated on to the abutting residential trailer park; and B-11 was placed adjacent to a hydraulic lift inside the building at the site in order to determine if that lift had contributed to the contamination at the site. Based on the headspace screening results, and subsequent laboratory analysis of soil and groundwater samples, it appears that the hydraulic lift inside the building has not contributed to the release at the site; and it appears that the contamination has not affected the abutting residential trailer park, which abuts the subject site to the north.

Soil sample screening performed during this program reveal the presence of significantly elevated levels of VOC's (up to 117 ppm) in borings B-7, B-9, and B-10 (see Table 6 on page 23 for soil sample screening results). No elevated headspace readings (above background) were detected in soil samples obtained from borings B-8 and B-11. The soil samples containing the highest headspace readings from each of the five geoprobos were forwarded to Accutest Laboratories, Inc. of Marlborough, MA for analysis. The soil samples were tested for EPH, target PAH's, VPH, target VOC's, and RCRA 8

Metals. The results of this testing are summarized in the following Table 4, and laboratory results and the chain of custody are included in **Attachment "E"** of this report.

Table 4
Summary of Soil Testing Results – December 1998

Sample ID:	B-7/ S-3	B-8/ S-3	B-9/ S-3	B-10/ S-3	B-11/ S-2	Method 1 S-1/GW-2	Method 1 S-1/GW-3
Sample Depth (feet):	8-12	8-12	8-10	8-12	8-12	N/A	N/A
Headspace (ppm)	38.1	0.4	64.4	110.9	0.4	NE	N/A
VPH (µg/kg):							
C ₅ -C ₈ Aliphatics	15,700	<6,100	21,300	101,000	<5,600	100,000	100,000
C ₉ -C ₁₂ Aliphatics	<5,100	<6,100	5,680	29,800	<5,600	1,000,000	1,000,000
C ₉ -C ₁₀ Aromatics	17,400	<6,100	35,800	129,000	<5,600	100,000	100,000
VOC's (µg/kg):							
Ethylbenzene	<260	<300	696	1,130	<280	500,000	500,000
Toluene	471	<300	367	1,590	<280	500,000	500,000
Xylenes	922	<300	4,003	9,660	347	500,000	500,000
Naphthalene	485	<300	1,260	3,720	<280	100,000	100,000
EPH (µg/kg)							
C ₉ -C ₁₈ Aliphatics	76,300	<6,300	57,300	83,200	<6,300	1,000,000	1,000,000
C ₁₉ -C ₃₆ Aliphatics	2,730,000	19,100	1,800,000	2,810,000	<8,400	2,500,000	2,500,000
C ₁₁ -C ₂₂ Aromatics	<18,000	243,000	764,000	141,000	<18,000	800,000	800,000
PAH's (µg/kg):							
Acenaphthene	<540	<520	651	<530	<520	1,000,000	1,000,000
Naphthalene	<540	566	3,180	<530	<520	100,000	100,000
Fluoranthene	<540	<520	639	<530	<520	1,000,000	1,000,000
2-Methylnaphthalene	<540	764	3,560	<530	<520	500,000	500,000
Pyrene	<540	900	1,430	<530	<520	700,000	700,000
Phenanthrene	<540	<520	1,030	<530	<520	1,000,000	100,000
RCRA Metals (mg/kg)							
Arsenic	1.7	3.7	<1.0	<1.0	1.8	30	30
Barium	48.0	42.8	32.3	31.4	39.0	1,000	1,000
Chromium	12.8	22.9	5.3	27.8	10.1	1,000	1,000
Lead	30.2	13.0	13.3	27.8	38.0	300	300
Mercury	0.24	<0.11	<0.11	<0.10	<0.10	20	20
Notes: Bold indicates level exceeds Method 1 Standards							

As shown in the above Table 4, contaminants present above applicable Method 1 Standards are limited to C₅-C₈ Aliphatics, C₉-C₁₀ Aromatics, and C₁₉-C₃₆ Aliphatics, all of which were detected in boring B-

10, where separate-phase product was detected. A Risk Characterization discussing these results is included in Section V of this report.

All of the metals listed in Table 4 were eliminated as contaminants of concern, as each was detected at levels below the MDEP published background standards (1995), and well below the MCP Method 1 S-1 Standards.

On December 16, 1998 and January 12, 1999, the monitoring wells installed in geoprobes B-7, B-8, B-9, and B-11 were purged of approximately three volumes of standing water to ensure that the sample were representative of the aquifer. Approximately 8.2 inches of separate-phase product was noted in B-10, and as a result, this well was not sampled at that time.

Groundwater samples were obtained from the monitoring wells with dedicated, disposable PVC bailers. The groundwater samples were preserved according to EPA guidelines published in 40 CFR 136, and immediately forwarded to Accutest for testing. Groundwater samples obtained from the monitoring wells installed in the geoprobes at the site were tested for EPH, target PAH's, VPH, target VOC's, dissolved RCRA 8 Metals, and Halogenated VOC's by EPA Method 8010. Laboratory results from this sampling program are summarized in Tables 7 through 13 of this report, and laboratory reports and Chains-of-Custody are included in **Attachment "E"** of this report.

Finally, a soil excavation and removal program was performed at the site in October of 1998 as part of a RAM Addendum. This program was performed in order to supplement the ongoing bioremediation program, which was initiated as a RAM in April of 1997. This program consisted of the excavation and removal of approximately 114 tons of waste oil contaminated soil, in an area between the two recovery wells at the site, as shown in Figure 3 in **Attachment "A"**. The soil was excavated by Cyn Environmental Services, Inc. of South Boston, MA, and the contaminated soil was transported to Bardon Trimount Environmental Services recycling facility in Stoughton, MA. Approximately 2,000 gallons of groundwater/oil mixture from the excavation was also pumped from the excavation by Cyn at that time. A copy of the Bill of Lading and disposal receipts for the soil and groundwater removed as part of this RAM Addendum are included in **Attachment "F"** of this report.

Upon the completion of the excavation activities, soil samples were collected from the northern, western, and southern sides of the southern section of the excavation, as shown in Figure 3 in **Attachment "A"**. In order to allow access to the western portion of the site, the northern portion of the excavation was immediately filled in, prior to obtaining soil samples from the sidewalls. As a result, a motor-driven, hand-held auger was utilized to obtain a total of three soil samples (HA-1 through HA-3) from the northern side of the excavated area on November 16, 1998.

Soil sample screening performed during this program did not reveal the presence of significantly elevated levels of VOC's (<10 ppm) in any of the samples collected from the sidewalls of the excavation, and moderate levels of headspace VOC's (10-25 ppm) were noted in the samples obtained from the hand auger. The soil samples obtained from the sidewalls were submitted to Accutest for testing for EPH and target PAH's, and the samples obtained via hand auger were tested by Accutest for TPH via EPA Method 418.1. The results of this testing are summarized in the following Table 5, and laboratory reports and the chain-of-custodies are included in **Attachment "E"** of this report.

Table 5

Summary of Soil Testing Results – Post-excavation Sampling, 10/98 & 11/98

Sample ID:	North	West	South	HA-1	HA-2	HA-3	Method 1 S-1/GW-3
Sample Depth (feet):	5-7	5-7	5-7	6-8	6-8	8-10	N/A
Headspace (ppm)	4.1	6.0	1.0	11.1	14.3	24.8	
TPH (mg/kg)	124 ¹	111 ¹	<3.52 ¹	926	1,260	6,370	800
EPH (mg/kg)							
C ₉ -C ₁₈ Aliphatics	<3.84	<3.84	<3.52	NT	NT	NT	1,000
C ₁₉ -C ₃₆ Aliphatics	50	54	<3.52	NT	NT	NT	2,500
C ₁₁ -C ₂₂ Aromatics	74	57	<3.52	NT	NT	NT	800
PAH's (mg/kg):							
Anthracene	0.46	<0.396	<0.363	NT	NT	NT	1,000
Benzo(a)anthracene	3.2	1.2	<0.363	NT	NT	NT	0.7
Benzo(a)pyrene	3.1	1.6	<0.363	NT	NT	NT	0.7
Benzo(b)fluoranthene	2.0	0.45	<0.363	NT	NT	NT	0.7
Benzo(g,h,i)perylene	2.0	1.2	<0.363	NT	NT	NT	1,000
Benzo(k)fluoranthene	2.2	<0.396	<0.363	NT	NT	NT	7
Chrysene	3.2	1.5	<0.363	NT	NT	NT	7
Fluoranthene	5.1	1.4	<0.363	NT	NT	NT	1,000
Indeno(1,2,3-cd)pyrene	1.7	<0.396	<0.363	NT	NT	NT	0.7
Phenanthrene	1.4	0.73	0.45	NT	NT	NT	100 ²
Pyrene	3.4	1.3	<0.363	NT	NT	NT	700

Notes: 1 = TPH is combined EPH levels.

2 = The S-1/GW-2 and GW-3 Standards are identical for every compound listed except Phenanthrene, where the S-1/GW-3 Standard is listed.

Bold indicates level exceeds Method 1 Standards

As shown in the above Table 5, TPH concentrations in excess of MCP Method 1 Standards were detected in soil samples obtained from the samples obtained via hand auger (HA-1 through HA-3) in the area of the RAM excavation, which was performed in August of 1998. No EPH compounds were detected above Method 1 standards in soil samples obtained from the northern, western, and southern sides of this excavation.

With regard to PAH's, it should be noted that ash was observed in the fill material when soil samples were obtained from soil remaining on the northern and western sides of the excavation, which was performed as a RAM Addendum in August of 1998. The levels of PAH's in samples obtained from this area do not correlate with the levels of petroleum detected in this and other areas, and each of the PAH's detected above MCP Method 1 Standards (Benzo[a]anthracene, Benzo[a]pyrene, Benzo[b]fluoranthene

and Indeno[1,2,3-cd]pyrene) were not detected in any other samples (soil or groundwater) obtained from the site. Therefore, the PAH's detected in the soil samples obtained from the northern wall of this excavation are not considered "contaminants of concern" regarding the waste oil release at the site. In addition, the PAH's detected are exempt from DEP notification requirements pursuant to 310 CMR 40.0317(9).

The following Table 6 is a summary of headspace screening results obtained during the test boring programs performed at the site in July of 1996 and December of 1998 by IES, Inc. The locations of the test borings advanced at the site are shown in Figure 3 in **Attachment "A"**, and test boring logs are included in **Attachment "D"** at the end of this report.

Table 6
Soil Sample Screening Results

Boring #/Date	Sample No.	Depth (feet)	VOC's (ppm)
B-1 7/17/96	S-1	0.5 - 2.5	0.3
	S-2	5.0 - 7.0	45
	S-3	10.0 - 12.0	97
B-2 7/17/96	S-1	0.5 - 2.5	14.6
	S-2	5.0 - 7.0	155
B-3 7/17/96	S-1	0.5 - 2.5	68
	S-2	5.0 - 7.0	3.5
B-4 7/17/96	S-1	0.5 - 2.5	5.4
	S-2	5.0 - 7.0	11.0
	S-3	10.0 - 12.0	81
B-5 7/17/96	S-1	0.5 - 2.5	1.3
	S-2	5.0 - 7.0	21
	S-3	10.0 - 12.0	85
B-6 7/17/96	S-1	0.5 - 2.5	4.3
	S-2	5.0 - 7.0	61
B-7 12/10/98	S-1	0.0 - 4.0	0.4
	S-2	4.0 - 8.0	0.4
	S-3	8.0 - 12.0	38.1
	S-4	12.0 - 16.0	12.4
B-8 12/10/98	S-1	0.0 - 4.0	0.4
	S-2	4.0 - 8.0	0.4
	S-3	8.0 - 12.0	0.4
	S-4	12.0 - 16.0	0.4
B-9 12/10/98	S-1	0.0 - 4.0	0.4
	S-2	4.0 - 8.0	63.6
	S-3	8.0 - 10.0	64.4
B-10 12/10/98	S-1	0.0 - 4.0	9.6
	S-2	4.0 - 8.0	117.1
	S-3	8.0 - 12.0	110.9
B-11 12/10/98	S-1	0.0 - 4.0	0.4
	S-2	4.0 - 8.0	0.4
	S-3	8.0 - 12.0	0.4

Notes: Screening parameters for the above are as follows:

1. HNU PI-101 Photoionization detector
2. @ 10.2 Electron Volts
3. Span Calibrated for Benzene (Required by DEP)
4. Background at 0.4 ppm

Bold indicates sample submitted for laboratory analysis

The following Tables 7 through 13 are summaries of various groundwater sampling and analysis programs performed at the site by IES from July of 1996 through January of 1999. Included after each table is a brief discussion of the data, including details of how the maximum exposure point concentration (EPC) for each contaminant was determined. An overview of the methodology employed for calculating EPC's is included in the "Risk Characterization", which is included in Section V of this report.

Laboratory reports from previous rounds of testing were previously submitted to the DEP, and laboratory reports for the supplemental testing performed for this investigation are included in **Attachment "E"** at the end of this report.

Table 7
Summary of Groundwater Testing Results

BENZENE (µg/l)			TOLUENE (µg/l)			ETHYLBENZENE (µg/l)		
Well ID	Date	Level	Well ID	Date	Level	Well ID	Date	Level
B-1	7/96	<5,000	B-1	7/96	18,000	B-1	7/96	49,000
	11/98	<5		11/98	<5		11/98	<5
B-2	7/96	180,000	B-2	7/96	840,000	B-2	7/96	400,000
B-3	7/96	21	B-3	7/96	68	B-3	7/96	34
	4/97	<1		4/97	<1		4/97	<1
	9/97	<1		9/97	<1		9/97	<1
	3/98	<2		3/98	<2		3/98	<2
	7/98	<5		7/98	<5		7/98	<5
B-4	7/96	170	B-4	7/96	41	B-4	7/96	140
	9/97	31		9/97	3		9/97	19
	3/98	6.8		3/98	2.6		3/98	<2
	7/98	<8.5		7/98	<8.5		7/98	<8.5
B-5	7/96	70	B-5	7/96	22	B-5	7/96	52
	3/98	8.2		3/98	2.4		3/98	4.0
	7/98	<5		7/98	<5		7/98	<5
B-6	7/96	28	B-6	7/96	2.1	B-6	7/96	<1.0
	4/97	8		4/97	<1		3/97	<1
	9/97	21		9/97	2		9/97	<1
	7/98	<5		7/98	<5		7/98	<5
B-7	12/98	10.4	B-7	12/98	<5	B-7	12/98	<5
B-8	12/98	<5	B-8	12/98	<5	B-8	12/98	<5
B-9	12/98	<5	B-9	12/98	<5	B-9	12/98	<5
B-10	12/98	NT	B-10	12/98	NT	B-10	12/98	NT
B-11	12/98	<5	B-11	12/98	<5	B-11	12/98	<5
	GW-2	2,000		GW-2	6,000		GW-2	30,000
	GW-3	7,000		GW-3	50,000		GW-3	4,000

Notes: GW-2 = MCP Method 1 Groundwater Category GW-2
 GW-3 = MCP Method 1 Groundwater Category GW-3
 NT = Not tested due to the presence of separate-phase product
Bold numbers exceed GW-2, and/or GW-3 Standards

As shown in the above Table 12, the levels of Benzene, Toluene, and Ethylbenzene exceeded the MCP Method 1 GW-2 and GW-3 Standards in groundwater samples obtained from monitoring wells B-1 and B-2 in 1996. However, the areas immediately adjacent to these wells were excavated and recovery wells were installed as part of an Immediate Response Action. Monitoring well B-2 was destroyed, and B-1 was recently paved over, after being sampled in November of 1998. The most recent round of testing indicated that the levels of Benzene, Toluene, and Ethylbenzene in monitoring well B-1 have been reduced to below laboratory quantitation limits. In addition, based on the recent low levels of Benzene, Toluene and Ethylbenzene present in the monitoring wells located immediately down gradient of B-2 (B-1 and B-7), it is likely that the levels of these VOC's in this area have also been reduced to below Method 1 Standards, although this has not been confirmed at this time.

Benzene, Toluene, or Ethylbenzene have not been detected in any other monitoring wells above MCP Method 1 Standards. Please note that due to the presence of separate-phase product in B-10 during the most recent round of sampling, it is likely that elevated levels of VOC's remain at this location, although this well was not tested due to the presence of the separate-phase product (waste oil).

An EPC of 34.4 $\mu\text{g/l}$ was calculated for Benzene based on an average of analytical results for B-5, as described in Section 5.8 of the Risk Characterization. When the contaminant was not detected in a sample, one-half the detection limit was used for averaging. The EPC calculated for Benzene is below the applicable MCP Method 1 GW-2 and GW-3 Standards of 2,000 $\mu\text{g/l}$ and 7,000 $\mu\text{g/l}$, respectively.

An EPC of 8.95 $\mu\text{g/l}$ was calculated for Toluene based on an average of analytical results for B-5, as described in Section 5.9 of the Risk Characterization. When the contaminant was not detected in a sample, one-half the detection limit was used for averaging. The EPC calculated for Toluene is below the applicable MCP Method 1 GW-2 and GW-3 Standards of 6,000 $\mu\text{g/l}$ and 50,000 $\mu\text{g/l}$, respectively.

An EPC of 19.5 $\mu\text{g/l}$ was calculated for Ethylbenzene based on an average of analytical results for B-5, as described in Section 5.9 of the Risk Characterization. When the contaminant was not detected in a sample, one-half the detection limit was used for averaging. The EPC calculated for Ethylbenzene is also well below the applicable MCP Method 1 GW-2 and GW-3 Standards of 30,000 $\mu\text{g/l}$ and 4,000 $\mu\text{g/l}$, respectively.

Table 8
Summary of Groundwater Testing Results

XYLENES (µg/l)			MTBE (µg/l)		
Well ID	Date	Level	Well ID	Date	Level
B-1	7/96	325,000	B-1	7/96	<5,000
	11/98	<5		11/98	72.4
B-2	7/96	1,908,000	B-3	7/96	<10
B-3	7/96	226		4/97	<1
	4/97	<1		9/97	<1
	9/97	<1		3/98	2.8
	3/98	6.4		7/98	<5
	7/98	<5	B-4	7/96	<10
B-4	7/96	620		9/97	4
	9/97	48		3/98	<2
	3/98	17.5		7/98	<8.5
	7/98	<8.5	B-5	7/96	<1.0
B-5	7/96	350		3/98	3.8
	3/98	17.3		7/98	<5
	7/98	<5	B-6	7/96	<1.0
B-6	7/96	19		4/97	50
	4/97	2		9/97	8
	9/97	3		7/98	<5
	7/98	<5	B-7	12/98	8.7
B-7	12/98	24.1	B-8	12/98	<5
B-8	12/98	<5.0	B-9	12/98	<5
B-9	12/98	<5	B-10	12/98	NT
B-10	12/98	NT	B-11	12/98	6.0
B-11	12/98	<5		GW-2	50,000
	GW-2	6,000		GW-3	50,000
	GW-3	50,000			

Notes: GW-2 = MCP Method 1 Groundwater Category GW-2
 GW-3 = MCP Method 1 Groundwater Category GW-3
 NT = Not tested due to the presence of separate-phase product
Bold numbers exceed GW-2, and/or GW-3 Standards

As shown in the above Table 8, the levels of Xylenes exceeded the MCP Method 1 GW-2 and GW-3 Standards in groundwater samples obtained from monitoring wells B-1 and B-2 in 1996. However, the areas immediately adjacent to these wells were excavated and recovery wells were installed as part of an Immediate Response Action. Monitoring well B-2 was destroyed, and B-1 was recently paved over, after being sampled in November of 1998. The most recent round of testing indicated that the levels of Xylenes in monitoring well B-1 have been reduced to below laboratory quantitation limits. In addition, based on the recent low levels of Xylenes present in the monitoring wells located immediately down gradient of B-2 (B-1 and B-7), it is likely that the levels of these VOC's in this area have also been reduced to below Method 1 Standards, although this has not been confirmed at this time.

Xylenes have not been detected in any other monitoring wells above MCP Method 1 Standards. Please note that due to the presence of separate-phase product in B-10 during the most recent round of sampling, it is likely that elevated levels of VOC's remain at this location, although this well was not tested due to the presence of the separate-phase product.

Finally, MTBE has not been detected at the site above either the applicable Reportable Concentrations (RCGW-2), or above the MCP Method 1 GW-2 or GW-3 standards. In addition, the presence of MTBE does not correlate with the presence and levels of other contaminants present. The low levels of MTBE present are likely background conditions in an urban environment, and are not associated with the waste oil release at the site. Therefore, MTBE is eliminated as a contaminant of concern.

An EPC of 123.3 $\mu\text{g/l}$ was calculated for Xylenes based on an average of analytical results for B-5, as described in Section 5.9 of the Risk Characterization. When the contaminant was not detected in a sample, one-half the detection limit was used for averaging. The EPC calculated for Xylenes is well below the applicable MCP Method 1 GW-2 and GW-3 Standards of 6,000 $\mu\text{g/l}$ and 50,000 $\mu\text{g/l}$, respectively.

Table 9
Summary of Groundwater Testing Results

2-METHYLNAPHTHALENE			ACENAPHTHYLENE (µg/l)			NAPHTHALENE (µg/l)		
Well ID	Date	Level	Well ID	Date	Level	Well ID	Date	Level
B-3	3/98	<2.6	B-3	3/98	<2.6	B-3	3/98	6.8
	7/98	<10		7/98	<10		7/98	<10
B-4	3/98	6.1	B-4	3/98	6.1	B-4	3/98	27.3
	7/98	<10		7/98	<10		7/98	<17
B-5	3/98	<2.9	B-5	3/98	<2.9	B-5	3/98	2.9
	7/98	<11		7/98	<11		7/98	<10
B-6	7/98	<11	B-6	7/98	<11	B-6	7/98	<10
B-7	12/98	<5.3	B-7	12/98	<5.3	B-7	12/98	7.6
B-8	12/98	<5.4	B-8	12/98	<5.4	B-8	12/98	<5
B-9	12/98	<5.3	B-9	12/98	<5.3	B-9	12/98	<5
B-10	12/98	NT	B-10	12/98	NT	B-10	12/98	NT
B-11	12/98	<5.3	B-11	12/98	<5.3	B-11	12/98	<5
	GW-2	10,000		GW-2	10,000		GW-2	6,000
	GW-3	3,000		GW-3	3,000		GW-3	6,000
Notes: GW-2 = MCP Method 1 Groundwater Category GW-2 GW-3 = MCP Method 1 Groundwater Category GW-3 NT = Not tested due to the presence of separate-phase product Bold numbers exceed GW-2, and/or GW-3 Standards								

As shown in the above Table 9, 2-Methylnaphthalene, Acenaphthylene, and Naphthalene were not detected above Method 1 GW-1, GW-2, or GW-3 standards in any of the samples obtained from the site during any of the sampling events.

As 2-Methylnaphthalene, Acenaphthylene, and Naphthalene were only detected in one well (B-4) during one round of sampling (July 1996), which was conducted prior to any remedial activities (IRA, RAM, or RAM Addendum), these compounds have been eliminated as contaminants of concern, as described in the Risk Characterization included in Section V of this report.

Table 10
Summary of Groundwater Testing Results

TOTAL PETROLEUM HYDROCARBONS (TPH) (mg/l)										
Well ID	Date	Level		Well ID	Date	Level		Well ID	Date	Level
B-1	7/96	17,500		B-5	7/96	31.6		B-7	12/98	11.336
B-2	7/96	123,000			3/98	2.5		B-8	12/98	0.329
B-3	7/96	24.6			7/98	3.8		B-9	12/98	0.175
	4/97	<0.3		B-6	7/96	27.5		B-10	12/98	NT
	9/97	3.5			4/97	5.4		B-11	12/98	0.855
	3/98	1.6			9/97	3.2		GW-2	1	
	7/98	0.077			7/98	0.22			GW-3	20
B-4	7/96	352		Notes: GW-2 = MCP Method 1 Groundwater Category GW-2 GW-3 = MCP Method 1 Groundwater Category GW-3 NT = Not Tested due to the presence of separate-phase product Results from 3/98, 7/98 and 12/98 are combined EPH/VPH concentrations and are used for comparison purposes Bold numbers exceed GW-2, and/or GW-3 Standards						
	9/97	35.5								
	3/98	14.5								
	7/98	10.52								

As shown in the above Table 10 the levels of TPH contamination have generally decreased in all of the wells where it was detected, with only minor variations in B-3 (4/97 to 9/97) and B-5 (3/98 to 7/98). The most recent rounds of testing revealed the presence of TPH above Method 1 GW-2 Standards in several of the monitoring wells at the site. However, the levels of TPH did not exceed Method 1 GW-3 standards in any of the samples tested during the most recent rounds of sampling. After of 1997, TPH testing was performed via EPH/VPH methodology, which is further detailed in Tables 11 and 12.

An EPC of 20.2 mg/l was calculated for TPH based on based on an average of analytical results for B-4, as described in Section 5.9 of the Risk Characterization. The EPC for TPH exceeds the Method 1 GW-2 and GW-3 standards of 1 mg/l and 20 mg/l, respectively. However, it is anticipated that future risk assessments will focus on the individual EPH and VPH categories, as summarized in the following Tables 11 and 12.

Table 11
Summary of Groundwater Testing Results

VOLATILE PETROLEUM HYDROCARBONS (VPH) (µg/l)								
C ₅ - C ₈ ALIPHATICS			C ₉ - C ₁₂ ALIPHATICS			C ₉ - C ₁₀ AROMATICS		
Well ID	Date	Level	Well ID	Date	Level	Well ID	Date	Level
B-1	11/98	207	B-1	11/98	ND	B-1	11/98	ND
B-3	3/98	68.0	B-3	3/98	938	B-3	3/98	619
	7/98	<50		7/98	77		7/98	<50
B-4	3/98	178	B-4	3/98	1,520	B-4	3/98	1,150
	7/98	<85		7/98	320		7/98	300
B-5	3/98	196	B-5	3/98	308	B-5	3/98	179
	7/98	<50		7/98	170		7/98	68
B-6	7/98	<50	B-6	7/98	120	B-6	7/98	93
B-7	12/98	124	B-7	12/98	<100	B-7	12/98	432
B-8	12/98	<100	B-8	12/98	<100	B-8	12/98	<100
B-9	12/98	<100	B-9	12/98	<100	B-9	12/98	<100
B-10	12/98	NT	B-10	12/98	NT	B-10	12/98	NT
B-11	12/98	<100	B-11	12/98	<100	B-11	12/98	<100
	GW-2	1,000		GW-2	1,000		GW-2	5,000
	GW-3	4,000		GW-3	20,000		GW-3	4,000
Notes: GW-2 = MCP Method 1 Groundwater Category GW-2 GW-3 = MCP Method 1 Groundwater Category GW-3 Bold numbers exceed GW-2 and/or GW-3 Standards NT = Not Tested due to the presence of separate-phase product								

As shown in the above Table 11, the levels of C₉-C₁₂ Aliphatics were detected above Method 1 Standards in monitoring well B-4 in March of 1998. However, the level of this compound in this well decreased to below Method 1 standards when tested in July of 1998, and has not been detected above applicable Method 1 Standards in any other monitoring wells during any of the rounds of groundwater testing performed at the site.

The C₅-C₈ Aliphatics and C₉-C₁₀ Aromatics have not been detected above Method 1 Standards in any of the monitoring wells during any rounds of sampling at the site. Please note that due to the presence of separate-phase product in B-10 during the most recent round of sampling, it is likely that elevated levels of VPH

compounds remain at this location, although this well was not tested due to the presence of the separate-phase product.

Because the EPH/VPH testing protocol is fairly recent, few samples have been analyzed for these parameters. Because there were few data points available, the EPH fraction EPC's were conservatively based on the highest concentration detected to date when only one round of sampling was performed (B-1, B-6 B-7, B-8, B-9, and B-11); or the temporal average of the two rounds of testing performed for wells B-3, B-4, and B-5.

An EPC of 207 $\mu\text{g/l}$ was calculated for $\text{C}_5\text{-C}_8$ Aliphatics based on the analytical results for B-1 when tested in November of 1998, as described in the Risk Characterization in Section V of this report.. The EPC calculated for $\text{C}_5\text{-C}_8$ Aliphatics is below the applicable MCP Method 1 GW-2 and GW-3 Standards of 1,000 $\mu\text{g/l}$ and 4,000 $\mu\text{g/l}$, respectively.

An EPC of 920 $\mu\text{g/l}$ was calculated for $\text{C}_9\text{-C}_{12}$ Aliphatics based on based on an average of analytical results for B-4, as described in Risk Characterization in Section V of this report. The EPC calculated for $\text{C}_9\text{-C}_{12}$ Aliphatics is below the applicable MCP Method 1 GW-2 and GW-3 Standards of 1,000 $\mu\text{g/l}$ and 20,000 $\mu\text{g/l}$, respectively.

An EPC of 725 $\mu\text{g/l}$ was calculated for $\text{C}_9\text{-C}_{10}$ Aromatics based on based on an average of analytical results for B-4, as described in Section 5.9 of the Risk Characterization. The EPC calculated for $\text{C}_9\text{-C}_{10}$ Aromatics is below the applicable MCP Method 1 GW-2 and GW-3 Standards of 5,000 $\mu\text{g/l}$ and 4,000 $\mu\text{g/l}$, respectively.

Table 12
Summary of Groundwater Testing Results

EXTRACTABLE PETROLEUM HYDROCARBONS (EPH) (µg/l)								
C ₉ - C ₁₈ ALIPHATICS			C ₁₉ - C ₃₆ ALIPHATICS			C ₁₁ - C ₂₂ AROMATICS		
Well ID	Date	Level	Well ID	Date	Level	Well ID	Date	Level
B-3	3/98	<2.6	B-3	3/98	<2.6	B-3	3/98	<2.6
	7/98	<100		7/98	<100		7/98	<100
B-4	3/98	1,690	B-4	3/98	9,620	B-4	3/98	383
	7/98	1,300		7/98	6,900		7/98	1,600
B-5	3/98	<2.9	B-5	3/98	1,820	B-5	3/98	<2.9
	7/98	<100		7/98	1,500		7/98	<100
B-6	7/98	<110	B-6	7/98	<110	B-6	7/98	<110
B-7	12/98	<63	B-7	12/98	580	B-7	12/98	10,200
B-8	12/98	<65	B-8	12/98	329	B-8	12/98	<180
B-9	12/98	<63	B-9	12/98	175	B-9	12/98	<180
B-10	12/98	NT	B-10	12/98	NT	B-10	12/98	NT
B-11	12/98	<63	B-11	12/98	376	B-11	12/98	479
	GW-2	1,000		GW-2	N/A		GW-2	50,000
	GW-3	20,000		GW-3	20,000		GW-3	30,000
Notes: GW-2 = MCP Method 1 Groundwater Category GW-2 GW-3 = MCP Method 1 Groundwater Category GW-3 NT = B-10 not tested due to the presence of separate-phase product Bold numbers exceed GW-2 and/or GW-3 Standards								

As shown in the above Table 12, the levels of C₉-C₁₈ Aliphatics were detected above the Method 1 GW-2 Standard in monitoring well B-4 during the rounds of EPH testing performed in both March and July of 1998. However, the levels of this compound has not exceeded the Method 1 GW-3 standard in any of the samples tested.

C₁₉-C₃₆ Aliphatics and C₁₁-C₂₂ Aromatics have not been detected above Method 1 Standards in any of the monitoring wells during any rounds of sampling at the site. Please note that due to the presence of separate-phase product in B-10 during the most recent round of sampling, it is likely that elevated levels of VPH compounds remain at this location, although this well was not tested due to the presence of the separate-phase product.

Because the EPH/VPH testing protocol is fairly recent, few samples have been analyzed for these parameters. Because there were few data points available, the EPH fraction EPC's were conservatively based on the highest concentration detected to date when only one round of sampling was performed (B-1, B-6 B-7, B-8, B-9, and B-11); or the temporal average of the two rounds of testing performed for wells B-3, B-4, and B-5.

An EPC of 1,495 $\mu\text{g/l}$ was calculated for $\text{C}_9\text{-C}_{18}$ Aliphatics based on the average analytical results for B-4 when tested in March and July of 1998, as described in the Risk Characterization, which is included in Section V of this report. The EPC calculated for $\text{C}_9\text{-C}_{18}$ Aliphatics exceeds the applicable MCP Method 1 GW-2 Standard of 1,000 $\mu\text{g/l}$, and is below the GW-3 Standard of 20,000 $\mu\text{g/l}$.

An EPC of 8,295 mg/l was calculated for $\text{C}_{19}\text{-C}_{36}$ Aliphatics based on based on an average of analytical results for B-4, as described in Section 5.9 of the Risk Characterization. The EPC calculated for $\text{C}_{19}\text{-C}_{36}$ Aliphatics is below the applicable MCP Method 1 GW-3 Standard of 20,000 $\mu\text{g/l}$. There is no GW-2 Standard for $\text{C}_{19}\text{-C}_{36}$ Aliphatics.

An EPC of 10,200 $\mu\text{g/l}$ was calculated for $\text{C}_{11}\text{-C}_{22}$ Aromatics based on based on the analytical results for B-7 when tested in December of 1998, as described in Section 5.9 of the Risk Characterization. The EPC calculated for $\text{C}_{11}\text{-C}_{22}$ Aromatics is below the applicable MCP Method 1 GW-2 and GW-3 Standards of 50,000 $\mu\text{g/l}$ and 30,000 $\mu\text{g/l}$, respectively.

Table 13

Summary of Supplemental Groundwater Testing Results – 1/99

Well #	Arsenic	Barium	Cadmium	Chromium	Lead	Mercury	Selenium	Silver	VOC's
B-4	<5.0	<100	<4.0	<10	<10	<0.50	<10	<5.0	ND
B-5	<5.0	<100	<4.0	<10	<10	<0.50	<10	<5.0	ND
B-6	<5.0	<100	<4.0	<10	<10	<0.50	<10	<5.0	ND
B-7	9.3	181	<4.0	<10	<10	<0.50	<10	<5.0	ND
B-8	<5.0	<100	<4.0	<10	<10	<0.50	<10	<5.0	ND
B-9	7.9	350	<4.0	12.2	70.4	<0.50	<10	<5.0	ND
B-11	11.7	129	<4.0	<10	<10	<0.50	<10	<5.0	ND
GW-2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
GW-3	400	30,000	10	2,000	30	1	80	7	N/A

Notes: All results are in µg/l

Bold results exceed Method 1 GW-3 Standards

VOC's = Halogenated Volatiles via EPA Method 8010.

As shown in the above Table 13 dissolved Lead was detected above the applicable Method 1 Standards in monitoring well B-9, and was not detected in any of the other samples tested. No other RCRA 8 Metals were detected above the applicable Method 1 Standards in any of the groundwater samples tested. In addition, Cadmium, Mercury, Selenium, and Silver were not detected, above laboratory quantitation limits in any of the samples tested, and therefore do not warrant further discussion.

Finally, testing for halogenated VOC's by EPA Method 8010 did not reveal the presence of any VOC's, above laboratory detection limits, in any of the groundwater samples tested.

An EPC of 9.3 µg/l was calculated for dissolved Arsenic based on based on the analytical results for B-11 when tested in December of 1998, as described in Section 5.9 of the Risk Characterization. The EPC calculated for dissolved Arsenic is below the applicable MCP Method 1 GW-3 Standard of 400 µg/l and 30,000 µg/l, and there is no GW-2 Standard.

An EPC of 350 µg/l was calculated for dissolved Barium based on based on the analytical results for B-9 when tested in December of 1998, as described in Section 5.9 of the Risk Characterization. The EPC

calculated for dissolved Barium is below the applicable MCP Method 1 GW-3 Standard of 30,000 $\mu\text{g/l}$ and 30,000 $\mu\text{g/l}$, and there is no GW-2 Standard.

An EPC of 9.3 $\mu\text{g/l}$ was calculated for dissolved Chromium based on based on the analytical results for B-9 when tested in December of 1998, as described in Section 5.9 of the Risk Characterization. The EPC calculated for dissolved Chromium is below the applicable MCP Method 1 GW-3 Standard of 400 $\mu\text{g/l}$ and 2,000 $\mu\text{g/l}$, and there is no GW-2 Standard.

An EPC of 70.4 $\mu\text{g/l}$ was calculated for dissolved Lead based on based on the analytical results for B-9 when tested in December of 1998, as described in Section 5.9 of the Risk Characterization. The EPC calculated for dissolved Lead exceeds the applicable MCP Method 1 GW-3 Standard of 30 $\mu\text{g/l}$ and there is no GW-2 Standard for Lead.

The following Tables 14 and 15 provide a summary of the maximum levels of each contaminant detected in soil samples obtained during the various testing programs at the site. It should be noted that contamination detected in soil, which was removed from the site as part of the IRA, is not included in this table, as such soil is no longer present at the site.

Table 14

**Summary of Maximum Contaminant Levels in Soil
Metals, TPH, EPH, and PAH's**

Compound	Maximum Concentration	Sample ID	Sample Depth (ft)	Sampling Date	Method 1 S-1/GW-3 ¹
Metals (mg/kg):					
Arsenic	3.7	B-8/S-3	8-12	12/98	30
Barium	48.0	B-7/S-3	8-12	12/98	1,000
Chromium	27.8	B-10/S-3	8-12	12/98	1,000
Lead	38.0	B-11/S-3	8-12	12/98	300
Mercury	0.24	B-7/S-3	8-12	12/98	20
TPH (mg/kg):	22,100	B-2/S-2	5-7	7/96	800
EPH (µg/kg)					
C ₉ -C ₁₈ Aliphatics	83,200	B-10	8-12	12/98	1,000,000
C ₁₉ -C ₃₆ Aliphatics	2,810,000	B-10	8-12	12/98	2,500,000
C ₁₁ -C ₂₂ Aromatics	764,000	B-9	8-10	12/98	800,000
PAH's (µg/kg):					
Acenaphthene	651	B-9	8-10	12/98	1,000,000
Anthracene	460	North	5-7	12/98	1,000,000
Benzo(a)anthracene	3,200	North	5-7	12/98	700
Benzo(a)pyrene	3,100	North	5-7	12/98	700
Benzo(b)fluoranthene	2,000	North	5-7	12/98	700
Benzo(g,h,i)perylene	2,000	North	5-7	12/98	1,000,000
Benzo(k)fluoranthene	2,200	North	5-7	12/98	7,000
Chrysene	3,200	North	5-7	12/98	7,000
Fluoranthene	639	B-9	8-10	12/98	1,000,000
	5,100	North	5-7	12/98	
Indeno(1,2,3-cd)pyrene	1,700	North	5-7	12/98	700
2-Methylnaphthalene	3,560	B-9	8-10	12/98	500,000
Naphthalene	3,180	B-9	8-10	12/98	100,000
Phenanthrene	1,030	B-9	8-10	12/98	100,000
	1,400	North	5-7	12/98	
Pyrene	1,430	B-9	8-10	12/98	700,000
	3,400	North	5-7	12/98	

Notes: 1 = The S-1/GW-2 and GW-3 Standards are identical for every compound listed except Phenanthrene, where the S-1/GW-3 Standard is listed.

Bold indicates level exceeds Method 1 Standards

As shown in the above Table 14, contaminants in the soil above MCP Method 1 Standards include TPH, and C₁₉-C₃₆ Aliphatics, as well as several PAH's. However, the highest levels of TPH were detected in boring B-2, which is located near the former underground tanks, and has most likely been flushed during

the inoculation for ongoing bioremediation program, which was initiated as a RAM in April of 1997. The highest levels of C₁₉-C₃₆ Aliphatics were detected in boring B-10, where separate-phase product was detected in December of 1998.

All of the metals listed in Table 14 were eliminated as contaminants of concern, as each was detected at levels below the MDEP published background standards (1995), and well below the MCP Method 1 S-1 Standards.

With regard to PAH's, it should be noted that ash was observed in the fill material when soil samples were obtained from soil remaining after the excavation and removal program. The levels of PAH's in samples obtained from this area do not correlate with the levels of petroleum detected in this and other areas, and each of the PAH's detected above MCP Method 1 Standards (Benzo[a]anthracene, Benzo[a]pyrene, Benzo[b]fluoranthene and Indeno[1,2,3-cd]pyrene) were not detected in any other samples (soil or groundwater) obtained from the site. Therefore, the PAH's detected in the soil samples obtained from the northern wall of this excavation are not considered "contaminants of concern" regarding the waste oil release at the site. In addition, the PAH's detected are exempt from DEP notification requirements pursuant to 310 CMR 40.0317(9).

Table 15
Summary of Maximum Contaminant Levels in Soil
VPH and VOC's

Compound	Maximum Concentration	Sample ID	Sample Depth (ft)	Sampling Date	Method 1 S-1/GW-3 ¹
VPH (µg/kg):					
C ₅ -C ₈ Aliphatics	101,000	B-10/S-3	8-12	12/98	100,000
C ₉ -C ₁₂ Aliphatics	29,800	B-10/S-3	8-12	12/98	1,000,000
C ₉ -C ₁₀ Aromatics	129,000	B-10/S-3	8-12	12/98	100,000
VOC's (µg/kg):					
Benzene	190	B-2/S-2	5-7	7/96	40,000
Ethylbenzene	8,000	B-2/S-2	5-7	7/96	500,000
Toluene	6,700	B-2/S-2	5-7	7/96	500,000
Xylenes	48,000	B-2/S-2	5-7	7/96	500,000
1,4-Dichlorobenzene	9.6	B-5/S-3	10-12	7/96	40,000
1,2-Dichlorobenzene	2.9	B-1/S-3	10-12	7/96	100,000
Acetone	320	B-2/S-2	5-7	7/96	40,000
Chloroform	29	B-2/S-2	5-7	7/96	10,000 ¹
Methylene Chloride	62	B-2/S-2	5-7	7/96	100,000
Naphthalene	850	B-2/S-2	5-7	7/96	100,000
1,1,1-Trichloroethane	37	B-2/S-2	5-7	7/96	100,000
Trichloroethene	22	B-2/S-2	5-7	7/96	20,000 ¹
Isopropylbenzene	270	B-2/S-2	5-7	7/96	NE
n-Propylbenzene	830	B-2/S-2	5-7	7/96	NE
Ethyl Methacrylate	510	B-2/S-2	5-7	7/96	NE
1,3,5-Trimethylbenzene	1,300	B-2/S-2	5-7	7/96	NE
1,2,4-Trimethylbenzene	2,100	B-2/S-2	5-7	7/96	NE
sec-Butylbenzene	86	B-2/S-2	5-7	7/96	NE
p-Isopropyltoluene	180	B-2/S-2	5-7	7/96	NE
C₉-C₁₀ Aromatics (Combined Total)²:	5,276	B-2/S-2	5-7	7/96	100,000

Notes: NE = None Established

1 = The MCP Method 1 S-1/GW-2 Standard is identical to the S-1/GW-3 Standard for all compounds except Phenanthrene, where the Method 1 S-1/GW-3 Standard is utilized.

2 = Combined Total of VOC's included in Table 4 which do not have established Method 1 Standards (NE).

These results are compared to C₉-C₁₀ Aromatics

Bold indicates level exceeds Method 1 Standard

As shown in the above Table 15, contaminants in the soil above MCP Method 1 Standards include C₅-C₈ Aliphatics and C₉-C₁₀ Aromatics, both of which were detected in samples obtained from B-10, in the area where separate-phase product was detected in December of 1998. Neither C₉-C₁₂ Aliphatics nor

any VOC's were detected above MCP Method 1 S-1/GW-2 or S-1/GW-3 Standards in any of the soil samples tested.

The following Tables 16 through 18 are summaries of the maximum levels of each contaminant present in the groundwater at the site. The tables include the highest levels detected during any of the testing programs performed from July of 1996 through January of 1999.

Table 16
Summary of Maximum Petroleum Levels in Groundwater

Compound	Overall Maximum Concentration/ Well ID & Date	# of Wells Detected (# Over Standard)	Current Maximum Concentration/ Well ID & Date	# of Wells Detected (# Over Standard)	MCP Method 1 Standard*
TPH (mg/l):**	123,000 B-2 (7/96)	10 (7)	11.3 B-7 (12/98)	8 (3)	1 ¹
EPH (µg/l):					
C ₉ -C ₁₈ Aliphatics	1,690 B-4 (3/98)	1 (1)	1,300 B-4 (7/98)	1 (1)	1,000 ²
C ₁₉ -C ₃₆ Aliphatics	9,620 B-4 (3/98)	6 (0)	6,900 B-7 (12/98)	6 (0)	20,000 ¹
C ₁₁ -C ₂₂ Aromatics	10,200 B-7 (12/98)	3 (0)	10,200 B-7 (12/98)	3 (0)	30,000 ¹
VPH (µg/l):					
C ₅ -C ₈ Aliphatics	207 B-1 (12/98)	6 (0)	207 B-1 (12/98)	2 (0)	1,000 ¹
C ₉ -C ₁₂ Aliphatics	1,520 B-4 (3/98)	4 (1)	320 B-4 (7/98)	4 (0)	1,000 ¹
C ₉ -C ₁₀ Aromatics	1,150 B-4 (3/98)	5 (0)	432 B-7 (12/98)	4 (0)	4,000 ²

Notes: * Most conservative applicable standard used as follows:

1 = MCP Method 1 GW-2 Standard

2 = MCP Method 1 GW-3 Standard

Bold indicates level exceeds applicable standard

** After 1997 TPH values listed are combined EPH/VPH concentrations

As shown in the above Table 16 contaminants present above the applicable Standards in the most recent rounds of sampling are limited to total TPH and C₉-C₁₈ Aliphatics in monitoring well B-4. The highest current TPH concentration was noted in B-7, where none of the individual EPH or VPH compounds

exceeded the Method 1 Standards. Please note that the highest contaminant levels are likely present in B-10, however, this monitoring well was not sampled due to the presence of separate-phase product (waste oil).

Table 17

Summary of Maximum VOC's & PAH Levels in Groundwater

Compound	Overall Maximum Concentration/ Well ID & Date	# of Wells Detected (# Over Standard)	Current Maximum Concentration/ Well ID & Date	# of Wells Detected (# Over Standard)	Method 1 GW-2/ GW-3
VOC's (µg/l):					
Benzene	180,000 B-2 (7/96)	8 (3)	10.4 B-7 (12/98)	2 (0)	2,000 7,000
Ethylbenzene	400,000 B-2 (7/96)	6 (3)	ND N/A	0 (0)	30,000 4,000
Toluene	840,000 B-2 (7/96)	6 (2)	ND N/A	0 (0)	6,000 50,000
Xylenes	1,908,000 B-2 (7/96)	7 (2)	24.1 B-7 (12/98)	1 (0)	6,000 50,000
MTBE	72.4 B-1 (11/98)	7 (0)	72.4 B-1 (11/98)	3 (0)	50,000 50,000
PAH's (µg/l):					
Acenaphthylene	6.1 B-4 (3/98)	1 (0)	ND N/A	0 (0)	10,000 3,000
2-Methylnaphthalene	6.1 B-4 (3/98)	1 (0)	ND N/A	0 (0)	10,000 3,000
Naphthalene	27.3 B-4 (3/98)	3 (0)	7.6 B-7 (12/98)	1 (0)	6,000 6,000

Notes: * Most conservative applicable standard used as follows:

1 = MCP Method 1 GW-2 Standard

2 = MCP Method 1 GW-3 Standard

Bold indicates level exceeds applicable standard

As shown in the above Table 17, no VOC's or PAH's were detected above the applicable Method 1 Standards during the most recent rounds of testing.

Table 18

Summary of Maximum Dissolved Metals Levels in Groundwater

Compound	Overall Maximum Concentration/ Well ID & Date	# of Wells Detected (# Over Standard)	Current Maximum Concentration/ Well ID & Date	# of Wells Detected (# Over Standard)	Method 1 GW-3
Metals (mg/l):					
Arsenic	11.7 B-11 (12/98)	3 (0)	11.7 B-11 (12/98)	3 (0)	400
Barium	350 B-9 (12/98)	3 (0)	350 B-9 (12/98)	3 (0)	30,000
Chromium	12.2 B-9 (12/98)	1 (0)	12.2 B-9 (12/98)	1 (0)	2,000
Lead	70.4 B-9 (12/98)	1 (1)	70.4 B-9 (12/98)	1 (1)	30

Notes: Most conservative applicable standard used as follows:

MCP Method 1 GW-3 Standard is used, and there is no GW-2 Standard for metals.

Bold indicates level exceeds applicable standard

As shown in the above Table 18, dissolved metals of concern include Arsenic, Barium, Chromium, and Lead. However, the only metal present above the applicable Method 1 standard is dissolved Lead in the monitoring well installed in boring B-9.

The following Tables 19 through 21 are summaries of the Exposure Point Concentrations (EPC's) of Petroleum compounds (EPH and VPH), PAH's, VOC's, and dissolved Metals in the groundwater at the site:

Table 19
Summary of Petroleum EPC's in Groundwater

Contaminant	Exposure Point Concentration	Method 1 Standard*	Sample Location / Notes
TPH (mg/l):**	20.2	1 ¹	B-4 (average of 3 samples 9/97 to 7/98)
EPH (µg/l):			
C ₉ -C ₁₈ Aliphatics	1,495	1,000 ¹	B-4 (average of 2 samples 3/97 to 7/98)
C ₁₉ -C ₃₆ Aliphatics	8,295	20,000 ²	B-4 (average of 2 samples 3/97 to 7/98)
C ₁₁ -C ₂₂ Aromatics	10,200	30,000 ²	B-7 (December 1998)
VPH (µg/l):			
C ₅ -C ₈ Aliphatics	207	1,000 ¹	B-1 (November 1998)
C ₉ -C ₁₂ Aliphatics	920	1,000 ¹	B-4 (average of 2 samples 3/97 to 7/98)
C ₉ -C ₁₀ Aromatics	725	4,000 ²	B-4 (average of 2 samples 3/97 to 7/98)
Notes: * Most conservative applicable standard used as follows: 1 = MCP Method 1 GW-2 Standard 2 = MCP Method 1 GW-3 Standard Bold indicates level exceeds applicable standard ** After 1997, TPH values listed are combined EPH/VPH concentrations			

As shown in the above Table 19, the only EPH or VPH constituent present above the applicable MCP Method 1 GW-2 and/or GW-3 standard is C₉-C₁₈ Aliphatics in monitoring well B-4. However, it should be noted that monitoring well B-10 currently contains separate-phase product, and therefore, was not tested.

Table 20

Summary of VOC's, PAH's & Dissolved Metals EPC's in Groundwater

Contaminant	Exposure Point Concentration	Method 1 Standard*	Sample Location / Notes
VOC's (µg/l):			
Benzene	34.4	2,000 ¹	B-5 (average of 3 samples, 7/96 to 7/98)
Toluene	8.95	6,000 ¹	B-5 (average of 3 samples, 7/96 to 7/98)
Ethylbenzene	19.5	4,000 ²	B-5 (average of 3 samples, 7/96 to 7/98)
Xylenes	123.3	6,000 ¹	B-5 (average of 3 samples, 7/96 to 7/98)
MTBE	Eliminated as a Contaminant of Concern		
PAH's (µg/l):			
Acenaphthylene	Eliminated as a Contaminant of Concern		
2-Methylnaphthalene	Eliminated as a Contaminant of Concern		
Naphthalene	Eliminated as a Contaminant of Concern		
Dissolved Metals			
Arsenic	11.7	400 ²	B-11 (12/98)
Barium	350	30,000 ²	B-11 (12/98)
Chromium	12.2	2,000 ²	B-9 (12/98)
Lead	70.4	30 ²	B-9 (12/98)
Notes: * Most conservative applicable standard used as follows: 1 = MCP Method 1 GW-2 Standard 2 = MCP Method 1 GW-3 Standard Bold numbers exceed the MCP Method 1 GW-2 and/or GW-3 Standard			

As shown in the above Table 20, the no VOC's were present above the applicable MCP Method 1 GW-2 and/or GW-3 standards. As previously discussed, MTBE was eliminated as a constituent of concern as its presence did not correlate with the presence and levels of other contaminants present, and the low levels of MTBE present were considered conditions in an urban environment, and not associated with the waste oil release at the site.

In addition, the PAH's detected (2-Methylnaphthalene, Acenaphthylene, and Naphthalene) were also eliminated as contaminants of concern, as they were only detected at levels well below Method 1

Standards, in one well (B-4), during one round of sampling (July 1996), which was conducted prior to any remedial activities (IRA, RAM, or RAM Addendum).

Finally, the only RCRA 8 Metal present above the applicable MCP Method 1 GW-2 and/or GW-3 standard is dissolved Lead in monitoring well B-9. However, it should be noted that this is based on only one round of sampling, and has not been confirmed with a second round of sampling.

The following Table 21 is a summary of the Exposure Point Concentrations (EPC's) for the contaminants detected in the soil at the site.

Table 21
Summary of EPC's in Soil

Compound	Exposure Point Concentration	Method 1 S-1, GW-2/3	Sample Location	Sample Depth (ft.)
TPH (mg/kg):	3,288	800	Average of B-3/S-1, B-4/S-3, B-5/S-3, B-6/S-3, North, West, South, HA-1, HA-2, HA-3, B-7, B-9, B-10	5-12
EPH (µg/kg):				
C ₉ -C ₁₈ Aliphatics	37,067	1,000,000	Average of North, West, South, B-7, B-9, B-10	5-12
C ₁₉ -C ₃₆ Aliphatics	1,240,960	2,500,000	Average of North, West, South, B-7, B-9, B-10	5-12
C ₁₁ -C ₂₂ Aromatics	174,460	800,000	Average of North, West, South, B-7, B-9, B-10	5-12
VPH (µg/kg):				
C ₅ -C ₈ Aliphatics	46,000	100,000	Average of B-7, B-9, B-10	8-12
C ₉ -C ₁₂ Aliphatics	12,677	1,000,000	Average of B-7, B-9, B-10	8-12
C ₉ -C ₁₀ Aromatics	60,733	100,000	Average of B-7, B-9, B-10	8-12
PAH's' (µg/kg):				
Acenaphthene	651	1,000,000	B-9/S-3	8-10
Fluoranthene	639	1,000,000	B-9/S-3	8-10
2-Methylnaphthalene	3,560	500,000	B-9/S-3	8-10
Naphthalene	3,180	100,000	B-9/S-3	8-10
Phenanthrene	1,030	100,000	B-9/S-3	8-10
Pyrene	1,430	700,000	B-9/S-3	8-12
VOC's (µg/kg):				
Benzene	37	40,000	B-6/S-2	5-7
Ethylbenzene	1,130	500,000	B-10/S-3	8-12
Toluene	1,590	500,000	B-10/S-3	8-12
1,4-Dichlorobenzene	9.6	40,000	B-5/S-3	10-12
1,2-Dichlorobenzene	1.8	100,000	B-4/S-3	10-12
Xylenes	9,660	500,000	B-10/S-3	8-12

Table 21 (continued)

Compound	Exposure Point Concentration	Method 1 S-1, GW-2/3	Sample Location	Sample Depth (ft.)
Metals (mg/kg):				
Arsenic			Eliminated as a Contaminant of Concern in Soil	
Barium			Eliminated as a Contaminant of Concern in Soil	
Chromium			Eliminated as a Contaminant of Concern in Soil	
Lead			Eliminated as a Contaminant of Concern in Soil	
Mercury			Eliminated as a Contaminant of Concern in Soil	
Notes: Bold indicates level exceeds applicable standard				

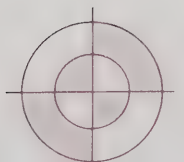
Due to the low levels of VOC's and PAH's present, the highest concentration detected was utilized as the Exposure Point Concentration. For TPH, the samples utilized included TPH results from borings B-3 through B-6 which were collected in 1996; the TPH and combined EPH/VPH results from samples obtained from the sidewalls and from the hand auger following the soil removal program in October of 1998; and combined VPH/EPH results in soil samples obtained from B-7, B-9, and B-10 in 1998. TPH results from Borings B-1 and B-2 were not utilized, as these borings were located in the area of soil removal performed as an IRA in 1996. Borings B-8 and B-11 were also not utilized, as these borings are not located within the contaminant plume, and are therefore, not considered part of the "Disposal Site".

RCRA 8 Metals were eliminated as contaminants of concern, as each was detected at levels below the MDEP published background standards (1995), and well below the MCP Method 1 S-1 Standards.

SECTION V

SECTION V

SECTION VI



SECTION I

SECTION II

SECTION III

SECTION IV

SECTION V

SECTION V

RISK CHARACTERIZATION

A. Preliminary Steps

A "Risk Characterization" for the subject site was completed by IES as part of this Phase II investigation. The likely foreseeable uses include the indoor and outdoor usage similar to its past and current use as automobile dealerships and associated automotive repair garages. In addition, in order to be conservative in the assessment, residential use is considered as a possible future use.

As detailed in the Risk Characterization report, a Method 1 Risk Assessment was performed at the site as defined in 310 CMR 40.0900. A Method 1 Risk Assessment is appropriate for the site as contamination is limited to the soil and groundwater; and no chemicals that bioaccumulate are located within the top two feet of soil.

Current activities at the site include the sales and service of automobiles. Human receptors at the site engage in passive activities, including working at the facility and walking the grounds. Foreseeable activities, if the site were to revert to residential use, include gardening by residents, recreational sports, and digging in yards by children.

Groundwater at the site is not a potential source of drinking water, and therefore, drinking, bathing, and washing with groundwater are not considered potential activities at the site.

As discussed in the "Risk Characterization", groundwater at the site is categorized as GW-2 and GW-3. Soil at the site is categorized as S-1, based on the current and foreseeable use of the site.

B. Exposure Assessment

1. Site Activities & Uses:

An exposure assessment was performed to identify current and reasonably foreseeable exposure scenarios by which contaminants from the site may reach potential human and environmental receptors based on current environmental conditions.

The subject site contains a total area of 138,452 square feet, and is occupied by a one-story brick and metal building, which is used as a used car dealership and repair garage; and a one-story, concrete block building, which is utilized as an automobile dealership (Audi/Mercedes) and associated automotive repair garage. The existing buildings occupied approximately 30 percent of the property, and remainder is paved for parking and access. No vegetation was observed on the site at the time of the site inspection.

Abutting properties are utilized for commercial and residential uses. The site is not completely fenced, and access by trespassers is possible. However, it should be noted that a chain-link fence is located between the site and the northerly abutting residential trailer park. No other residential properties abut the site. No Activity and Use Limitation (AUL) is in place at the property at this time, so future residential use of the site is considered a foreseeable use.

Activities at the site include the sales and service of automobiles. Human receptors at the site engage in passive activities including working at the facility and walking on the grounds. As no vegetation is present at the site, no landscaping or gardening is performed. Foreseeable activities, if the site were to revert to residential use, includes gardening by residents, recreational sports, and digging in yards by children.

2. Identification of Human Receptors:

Human receptor based on current usage of the site include full time workers at the site, visitors and customers, residents of nearby residential properties (children and adults), trespassers (children and adults), and construction workers involved in possible excavation at the site.

Unless an Activity and Use Limitation (AUL) is used to limit future site usage, potentially foreseeable site uses include conversion of the site to residential usage. Under such usage, children would be expected to be present frequently; and high intensity uses such as digging, recreational sports, and gardening likely would occur. Therefore, the ensure assessment for soil for all potentially foreseeable uses would be High Frequency for both adults and children.

3. Identification of Soil Categories:

Due to the commercial use of the site, the Frequency of Use by children is low, and by adults is "High". In addition, due to the fact that the entire area of the release is beneath the existing buildings or a paved parking area, which could not be used for gardening or recreational sports (which would have the potential to disturb soil and thus result in either direct contact with the soil or inhalation of soil derived dust), the Intensity of Use is "Low". Due to the depth of contamination at approximately the soil/groundwater interface, it is present at depths of less than 15 feet under a paved area, and therefore, the Accessibility of the soil is characterized as "Potentially Accessible". Therefore, based on Table 40.933(9) "Soil Category Selection Matrix - Human Exposure Potential" the soil is characterized as Category S-3.

However, in order to be conservative, the soil category based on potentially foreseeable usage of the site is S-1. The S-1 standard is also required to achieve a condition of "No Significant Risk", without the implementation of an Activity and Use Limitation.

3. Identification of Groundwater Categories

Pursuant to 310 CMR 40.0932(4), the groundwater is not categorized as GW-1, as the subject site is **NOT**:

- a. Within a Current Drinking Water Source Area
- b. Within a Potential Drinking Water Source Area

According to 310 CMR 40.0006, a Current Drinking Water Source Area is defined as groundwater located: (a) within the Zone II for a public water supply; (b) within the Interim Wellhead Protection Area for a public water supply; (c) within the Zone A of a Class A surface water body used as a public water supply; or (d) within 500 feet of a private water supply well. A Potential Drinking Water Source Areas is defined as groundwater located: (a) 500 feet or more from a public water supply distribution pipeline; (b) within an area designated by a municipality specifically for the protection of groundwater quality to ensure its availability for use as a source of potable water supply; or (c) within a Potentially Productive Aquifer that has not been excluded as a Non-Potential Drinking Water Source Area, as defined by the MCP.

In addition, according to 310 CMR 40.0932(6), "groundwater shall be defined to be in category GW-2 if it is located within 30 feet of an existing occupied building or structure, and the average annual depth to groundwater in that area is 15 feet or less". As the depth to groundwater when measured during the subsurface investigation in October of 1998 was at a depth less than 15 feet (approximately 11-13 feet), and within 30 feet of an occupied building, the groundwater at the site is categorized as GW-2. Finally, groundwater is categorized as GW-3 pursuant to 310 CMR 40.932(2), which applies to all groundwater in the Commonwealth as it is considered a potential source of discharge to surface water.

5. Identification of Environmental Receptors

Based on the MDEP Bureau of Waste Site Cleanup GIS map, the western side of the subject site is located in a "NOT Potentially Productive Medium Yield Aquifer". Nearby environmental receptors include the area immediately to the west of the site, which is "NOT Potentially Productive High Yield

Aquifer". In addition, the area located approximately 500 feet to the west of the site, on the opposite side of the Charles River; and the area located approximately 1,000 feet to the south of the site are identified as a "High Yield Potentially Productive Aquifer". The area located approximately 500 feet to the southwest of the site, across the Charles River is also identified as "Fresh Water Non-Forested Wetlands". The area located approximately 1,000 feet to the west of the site, and the area located approximately 1,000 feet to the south of the site are identified as a "Potentially Productive Medium Yield Aquifer". The westerly abutting Charles River is identified as "Lakes, Ponds, Other Fresh Water Features".

Finally, the 1997-1998 Massachusetts Natural Heritage Atlas does not list any Habitats of Rare Wildlife, Priority Sites of Rare Species Habitats and Exemplary Natural Communities, or Certified Vernal Pools within 0.5 miles of the site.

6. Identification of Groundwater Exposure Points

According to 310 CMR 40.0973(3)(a), groundwater exposure points are defined as "the wellhead and/or nearest tap of a well screened within the horizontal and vertical distribution of the oil or hazardous material in the groundwater. Existing water supply wells and monitoring wells shall be considered current or potential Exposure Points". Therefore, each monitoring well located within a contaminated area is considered a current or potential exposure point. Exposure Point Concentrations (EPC's) cannot be averaged among wells, however, temporal averaging of samples from a single well often is appropriate because of seasonal and sample-to-sample variation. In addition, due to the remedial activities performed at the site (IRA and ongoing RAM), a reduction in the levels of contamination has been noted. The determination of groundwater EPC's for each contaminant was previously discussed in Section IV of this report.

7. Identification of Soil Exposure Points

According to 310 CMR 40.0973(3)(b), soil exposure points are defined as "the vertical and horizontal distribution of the material in soil combined with the soil categories determined to be applicable". Therefore, spatial averaging of data is appropriate, if none of the data points represents a "hot spot".

Approximately 250 tons of waste oil contaminated soil has been removed from the site, and groundwater is the dominant contaminant transport media. For the purpose of this Phase II Risk Characterization, exposure point concentrations were estimated for VOC's and PAH's conservatively, and simply, by assuming that each data point may be a "hot spot". Due to the low levels of VOC's and PAH's present in the soil, no spatial averaging of data was performed for these compounds.

Exposure point concentrations for TPH, VPH, and EPH were estimated by averaging the results of various testing programs performed at the site in 1996 and 1998. The samples utilized included borings B-3 through B-6, which were advanced at the site in July of 1996, and borings B-7, B-9, and B-10, which were advanced at the site in December of 1998. In addition, sidewall samples, and samples obtained via a motor-driven, hand-held auger were obtained from the site following the removal of approximately 114 tons of waste oil contaminated soil as part of a RAM Addendum in October of 1998. The samples utilized for averaging did not include borings B-1 and B-2, both of which were located in areas where the removal of contaminated soil and separate-phase product was conducted as part of an Immediate Response Action. In addition, soil sample results obtained from borings B-8 and B-11 were also not utilized, as these borings were placed at locations beyond the boundaries of the Disposal Site. The determination of exposure point concentrations was previously discussed in Section IV of this report.

8. Exposure Pathways

As groundwater at the site is not used for drinking, irrigation, or other purposes, the most likely exposure scenario would be exposure to contaminated groundwater during potential excavation and construction activities. Exposure pathways include inadvertent ingestion, absorption through the skin, and inhalation of vapors.

Similarly, the most likely exposure scenario for soil would also be exposure to contaminated soil during potential excavation and construction activities. Exposure pathways would likely include ingestion, inhalation of fugitive dust, and dermal absorption from direct contact with the contaminated soil. If the site were to be used for residential purposes in the future, potential exposure from the consumption of homegrown fruits and vegetables is also possible.

9. Identification of Contaminants of Concern

The source of the contamination at the site is waste oil, which originated from two former underground tanks, which were excavated and removed from the site in 1987. Potential contaminants of concern primarily include Volatile and Extractable Petroleum Hydrocarbons (VPH and EPH), Polynuclear Aromatic Hydrocarbons (PAH's), Volatile Organic Compounds (VOC's), and RCRA 8 Metals. Tables 7 through 13 in this report list the contaminants detected in one or more soil or groundwater samples from the site, and Exposure Point Concentrations, summarized from the results presented in Tables 19 through 21.

Several of the VOC's detected are C₉ and C₁₀ Aromatics, and it should be noted that Method 1 standards have been developed for the summation of all petroleum compounds in the C₉-C₁₀ aromatics range because insufficient data are present to characterize the toxicity of individual compounds. Therefore, this Risk Characterization follows guidance from the DEP and compares the sum of these compounds to the Method 1 Standards for C₉-C₁₀ Aromatics.

As a result, n-Propylbenzene, Sec-Butylbenzene, Ethyl Methacrylate, Isopropylbenzene, p-Isopropyltoluene, 1,2,4-Trimethylbenzene, and 1,3,5-Trimethylbenzene are eliminated as individual contaminants of concern, because they are constituents of the C₉-C₁₀ Aromatics range.

In addition, MTBE, Acenaphthylene, 2-Methylnaphthalene and Naphthalene were also eliminated as contaminants of concern in groundwater due to their low frequency and/or low concentration. These contaminants were only detected once, and/or at concentrations significantly lower than the applicable Method 1 Standards. Finally, Arsenic, Barium, Chromium, Lead, and Mercury were eliminated as contaminants of concern in soil as each was detected at levels below the MDEP published background standards (1995), and well below the MCP Method 1 S-1 Standards.

Information on the chemical and physical properties and on the environmental fate and exposure for the contaminant of concern is included in **Attachment "G"** of this report.

10. Groundwater Exposure Point Concentrations

As previously discussed, each monitoring well at the site is considered an exposure point. In general, due to the past and ongoing remedial activities performed at the site, the most recent data regarding contamination was utilized for each well. However, in order to be conservative, a temporal average of the data from 1996 through 1998 for each contaminant within monitoring wells B-5 and B-6. These monitoring wells are located over 100 feet from the source of the contamination, and may not have been affected by the remedial activities. Finally, data obtained in July of 1996 were considered too old to be representative of current site conditions, due to the fact that these results were obtained prior to the initiation of both the Immediate Response Action (IRA), which was performed in August of 1996; the ongoing bioremediation program (RAM), which was initiated in May of 1997; and the soil excavation and removal program (RAM addendum), which was performed in August of 1998. When a contaminant was not detected in a given sampling round, one half of the detection limit was used in the determination of the temporal average.

The maximum EPC for each contaminant in groundwater is listed in Tables 16 through 18 in Section IV of this report. In addition, a description of how each maximum EPC was developed is included in the discussion of the analytic results in Section IV, after each of the Tables 7 through 13, which detail the sampling results for each contaminant.

11. Soil Exposure Point Concentrations

EPC's for soil were developed utilizing data for analytic testing of soils performed during test boring and geoprobe programs in July of 1996 and December of 1998; as well as from soil samples obtained following the soil removal program performed in October of 1998.

For the determination of EPC's, the average values detected in soil samples obtained from locations within the "Disposal Site" were used as the EPC for comparison to Method 1 Standards for EPH, VPH, and TPH, while the highest value detected was utilized as the EPC for VOC's and PAH's for the sake of simplicity and in order to be conservative. Based on the laboratory results, Table 21 in Section IV shows the soil EPC's used for this Risk Characterization.

Risk Characterization

1. Choice of Risk Characterization Method

A Method 1 Risk Characterization, as defined in 310 CMR 40.0900 was used to characterize the risks of harm to health, safety, public welfare, and the environment at the site. A Method 1 Risk Characterization compares contaminant concentrations at exposure points in the soil and groundwater to numerical standards listed in 310 CMR 40.0970 through 40.0979. Method 1 is appropriate for the site because contamination is limited to the soil and groundwater; and no chemicals that bioaccumulate are located within the top two feet of soil.

2. Identification of Method 1 Standards

Applicable Method 1 Standards for the contaminants of concern were identified for both current and potentially foreseeable uses. The potential exists for exposure to soil and groundwater from a variety of exposure pathways, including ingestion, absorption through the skin, and inhalation of vapors during potential excavation and construction activities. As previously discussed, Method 1 S-1, GW-2, and GW-3 Standards are all applicable, and the lowest applicable standard is identified in Tables 19 through 21.

2. Evaluation of Risk of Harm to Safety

All contamination at the site is below the paved ground surface or floor of a building, and does not pose a risk of injury or bodily harm to people. In addition, there are no rusted or corroded drums or containers; weakened berms; threats of fire or explosion or explosive vapors; unsecured pits ponds, lagoons, or other dangerous structures; or exposed and uncontained materials that exhibit the characteristics of corrosivity, reactivity, flammability, or contain infectious materials as described in 310 CMR 4010347.

3. Evaluation of Risk of Harm to the Environment

The risk of harm to site biota and habitats is characterized by evaluating ecological parameters using a two-stage approach. In Stage I, the objective is to identify and document conditions that do not warrant a Stage II Risk Characterization, either because of the absence of a potentially significant exposure pathway, or because environmental harm is readily apparent and therefore, additional assessment would be redundant.

The State I evaluation based on the available evidence indicates that there is no current or potential future exposure of Environmental Receptors to contamination at or from the disposal site. This conclusion is based on the fact that there is no current or past visible physical evidence that oil and/or hazardous material from the site has come to be located in surface soil, surface water, sediment or wetlands. In addition, there are no records or other evidence of current or past impacts of oil and/or hazardous materials from the site on wildlife, fish, or other aquatic biota. There is also no visible evidence or analytical data indicating the presence of oil and/or hazardous material from the site in surface water or sediment (including wetlands). Based on the limited migration noted at the site, it does not appear that contamination has, or will, migrate a sufficient distance to impact surface water or sediments (including wetlands). Finally, oil and/or hazardous materials is not located within two feet of the ground surface.

In summary, based on the absence of current or potential future exposure, a condition of "no significant risk of harm" to the site biota has been achieved, and a State II Environmental Risk Characterization is not required.

4. Evaluation of Risk of Harm to Public Health and Welfare

Residual chemicals at the site do not present nuisance conditions (i.e. unpleasant odors), and are unlikely to significantly impact property values. The contamination is also contained within the property boundaries, under a paved area of an automobile dealership. However, the presence of separate-phase product, the presumed presence of contaminants in groundwater above Upper Concentration Limits, and the presence of contaminants in the soil and groundwater above Method 1 Standards indicates that a condition of "No Significant Risk to Health and Public Welfare" has not yet been achieved at the site.

B. Hazard Identification

The source of contamination at the site is waste oil, and, therefore, based on the soil and groundwater programs performed at the site by IES from 1996 through 1999, potential contaminants of concern identified at the site include Polynuclear Aromatic Hydrocarbons (PAH's), Extractable Petroleum Hydrocarbons (EPH), Volatile Petroleum Hydrocarbons (VPH), Volatile Organic Compounds (VOC's), and metals. Contaminants detected in one or more soil or groundwater samples obtained from the site were listed in Tables 19-21.

As detailed in the attached "Risk Characterization" several VOC's are eliminated individually as contaminants of concern as they are all within the C₉-C₁₀ Aromatics range. These VOC's include Isopropylbenzene, n-Propylbenzene, 1,3,5-Trimethylbenzene, 1,2,4-Trimethylbenzene, sec-Butylbenzene, 4-Isopropyltoluene, and n-Butylbenzene. In addition, several compounds were detected only once, and at concentrations much lower than their applicable Reportable Concentrations and Method 1 standards, and were also eliminated as contaminants of concern based on low frequency and low concentrations. These compounds include MTBE, Acenaphthylene, 2-Methylnaphthalene, and Naphthalene in groundwater. Finally, Arsenic, Barium, Chromium, Lead, and Mercury were also eliminated as contaminants of concern in the soil as they were detected at concentrations below MDEP published background standards.

C. Imminent Hazard Evaluation

This section of this submittal is included in order to support an Imminent Hazard Evaluation for the release at the above referenced site as required by 310 CMR 40.0426. The subject site is occupied by an automobile dealership (Mercedes/Porsche/Audi), and a used car dealer. The two structures occupying the site include showrooms, offices, sales areas, and automotive repair garages. The release addressed by this Imminent Hazard Evaluation was detected during a groundwater sampling program which was performed by IES on July 22, 1996 at which time separate phase product (up to 2.65 feet) was measured in three of six monitoring wells at the site. The DEP was notified of these conditions on July 23, 1996, and the release was assigned RTN 3-14019.

Based on the information contained in this Phase II report, the following statements can be made that conditions at the site do not pose an Imminent Hazard:

- The two, 2,000 gallon underground waste oil tanks, which were the source of the contamination at the site were excavated and removed from the property in 1988 by Zecco, Inc. of Northborough, MA. Therefore, the source of the contamination has been eliminated.
- Laboratory testing of groundwater samples obtained from eleven monitoring wells at the site did not reveal the presence of any elevated levels of VOC's or TPH, above the applicable MCP Method 1 GW-2 or GW-3 standards in any of the down gradient wells (B-5 and B-6) present at the site. Separate-phase product was only detected in monitoring wells located in the area of the former underground waste oil tanks (B-2 and B-4), and in an area immediately down gradient of the former tanks (B-1 and B-10). This indicates that the contamination is migrating at a rate less than 200 feet a year, and therefore, a Condition of Substantial Release Migration is not present at the site at this time.
- An inspection of the subject site and the nearby Charles River, which is located approximately 300 feet to the west of the area containing separate-phase product, did not reveal the presence of any "break-out" of waste oil in at any location on the site, or along the Charles River and associated wetlands. Based on the information obtained from the subsurface exploration program, reportable levels of EPH, VPH, PAH's, VOC's, RCRA 8 Metals, and TPH are contained within the site boundaries. The excavation and removal of approximately 250 cubic yards of contaminated soil, the pumping of approximately 4,000 gallons of product (oil/water mixture), and the installation of two 10 inch recovery wells as part of IRA and RAM activities will also limit the extent of contamination.
- The two existing on-site buildings are automotive repair garages, which contain several large garage doors, which are open much of the time. No basements are present in either building at the site, and no significant cracks or holes were observed in the concrete floors of either buildings. There have been no complaints by any workers regarding an odor, and no significantly elevated headspace readings were noted in side the buildings, utilizing a ThermoEnvironmental Organic Vapor Meter (OVM).

- Finally, as previously stated, an IRA was completed at the site to remove the separate phase product, and a soil excavation and removal program, including the pumping of groundwater in the excavation, was performed as a RAM. Other than the presence of the separate phase product, none of the other conditions described in 310 CMR 40.0321 exist at the subject site at this time. In summary, there is no time critical situation present involving the separate phase product, and there is no breakout along the nearby Charles River, or migration of reportable levels of contamination off-site. It should also be noted that the area down gradient of the release is utilized as a paved parking area, and is owned by the PRP for this release.

Therefore, it is the opinion of Daniel G. Jaffe (LSP #2347) that an Imminent Hazard is not present at the subject site at this time. This is based on the preponderance of the evidence that the release conditions specified in 310 CMR 40.0321(2) and/or 40.0321(3) do not constitute an actual Imminent Hazard to human health in conformance with the Imminent Hazard Evaluation process described in 310 CMR 40.0426, and in consideration of the site-specific factors and risks assessment and risk management criteria contained in 310 CMR 40.0950.

D. Uncertainty Analysis

The procedures used to assess potential human health risks in this and similar evaluations are subject to a wide variety of uncertainties. In general, the main sources of uncertainty in the Risk Assessment of a reasonable well characterized site includes:

- Environmental chemistry sampling and analysis.
- Environmental parameter measurements.
- Fate and transport modeling.
- Toxicological data and dose-response extrapolations.
- Errors through combinations of the above.

Environmental chemistry sampling and analysis error can stem from the error inherent in the procedures, from a failure to take an adequate number of samples to arrive a sufficient areal resolution; from mistakes on the part of the sampler; or from the heterogeneity of the matrix being sampled. Some

sampling and analytical error is almost certainly present, but probably has a limited impact on the results of this risk assessment.

Exposure estimation is another potential source of error in this risk assessment. Exposure estimates in many cases are highly dependent on the prediction of intake values, exposure frequency, exposure duration, and other exposure assumptions used in this assessment. For this site, the largest source of uncertainty is associated with the assumption that future use of the property may be for residential purposes. Such use is considered to be unlikely given the current commercial nature of the site and the surrounding area, other than the northerly abutting mobile home park. Therefore, actual exposure at the site is likely to be much lower than predicted in the risk characterization.

The results of animal studies were used to predict the potential health effects of a chemical in humans. Extrapolation of toxicological data from animal tests is probably one of the largest sources of uncertainty in any risk assessment. There may be important, but unidentified differences in uptake, metabolism, and distribution in the body between the test species and humans. Typically, the animals are administered high doses of a chemical in a standard diet, while humans are generally exposed to much lower doses in a highly variable diet. Humans have a 70-75 year life expectancy, and may be exposed either intermittently or regularly for an exposure period ranging from months to a full lifetime. Because of these differences, it is not surprising that extrapolation error is a large source of uncertainty in a risk assessment. Even if human studies were available, uncertainties can be large because of diet, activity patterns, exposure duration, and frequency, as well as individual susceptibility.

E. Risk Characterization Conclusion

The conclusion of the Risk Assessment is that a condition of "No Significant Risk to Health and Public Welfare" has not yet been achieved at the site, based upon exceedances of Method 1 standards in the soil and groundwater as detailed in this report; as well as the presence of separate-phase product in one monitoring well (B-10) at the site.

However, the Risk Characterization also concluded that a condition of "No Significant Risk to Safety" does exist at the site; and a condition of "No Significant Risk to the Environmental" also exists at the

site, based on a Stage I Screening. In summary, the overall conclusion of the Risk Characterization is that a condition of No Significant Risk to health and public welfare has not yet been achieved at the subject site.



SECTION VI

CONCLUSIONS AND RECOMMENDATIONS

Summary of Findings

In December of 1998 and January of 1999, IES conducted a Phase II Comprehensive Site Assessment for the subject site. This Phase II Report was performed in accordance with 310 CMR 40.0835, and includes general disposal site information, disposal site history, site hydrogeological characteristics, the nature and extent of contamination, migration pathways and exposure potential, and a Risk Characterization. Information utilized in this report included laboratory testing of soil samples obtained from test boring programs performed in 1996 and 1998, and from a soil removal program performed as a RAM Addendum in 1998. In addition, groundwater sampling and analysis have been performed semi-annually at the site since 1996 as part of a monitoring program associated with an ongoing Release Abatement Measure (RAM) program. Finally, additional groundwater sampling and analysis was performed in December of 1998 and January of 1999 as part of this investigation.

The subject site consists of one, relatively flat, irregularly-shaped parcel of land located on the Veterans of Foreign Wars (VFW) Parkway (Route 1), in the West Roxbury Section of Boston, Massachusetts. The site is located in a mixed commercial and residential area of West Roxbury, and is zoned for commercial use. The subject site contains a total area of 138,452 square feet, and is occupied by a one-story brick and metal building, which is used as a used car dealership and repair garage; and a one-story concrete block building, which is utilized as an automobile dealership (Audi/Mercedes) and associated automotive repair garage.

The site was originally developed with the existing buildings in 1968, and the site has been utilized as an automobile dealership since that time. Prior to 1968 the subject site was vacant and undeveloped, and consisted of a wetland area associated with the nearby Charles River.

Contamination was discovered at the site during a tank removal program, which was performed by Zecco, Inc. of Northborough, MA on August 1, 1988. According to information obtained at the DEP, a

letter from Zecco indicated that two, 2,000 gallon underground waste oil tanks were removed from one excavation, and were leaking.

The DEP was notified of this release (Spill No. N88-1121), and as a result, a Notice of Responsibility (NOR) was issued to Clair Motors on August 26, 1988. Subsequently, a Preliminary Assessment (PA) form was completed by Zecco, and submitted to the DEP on March 3, 1989. The site was listed as a Location to be Investigated (LTBI) on April 15, 1989 (RTN 3-2126).

As a result of this release, a total of 100 cubic yards of contaminated soil were transported to the Consolidated Waste Services facility in Norridgewock, ME on December 7, 1988. A letter written by Zecco, Inc. dated September 9, 1988 stated that "all contaminated soil was removed from the pit down to the groundwater table". Laboratory analysis of a soil sample obtained from the excavation by Zecco indicated a TPH concentration of 12,757.3 mg/kg, and laboratory analysis of a groundwater sample obtained from the excavation indicated a TPH concentration of 300 mg/l.

Subsequently, a subsurface soil and groundwater sampling and analysis program was conducted at the site by IES, Inc. on July 17, 1996 as part of a Phase I investigation, and consisted of the advancement of six (6) test borings (B-1 through B-6), and the installation of monitoring wells in each of the borings. Soil sample screening performed during the test boring program indicated the presence of elevated levels of VOC's (up to 155 ppm) in soil samples obtained from all six of the borings advanced at the site. In addition, during the groundwater sampling program separate-phase product (waste oil) was detected in the monitoring wells installed in borings B-1 (2.65 feet), B-2 (1.60 feet), and B-4 (1.90 feet). The presence of this separate-phase product resulted in DEP notification of this "72-Hour" condition (RTN 3-14019).

Due to the presence of separate-phase product, Cyn Environmental Services, Inc. of South Boston, MA excavated two trenches, and installed individual 10 inch recovery wells in each of the trenches on July 31 and August 1, 1996 as an Immediate Response Action (IRA). A total of approximately 40-50 cubic yards of waste oil contaminated soil was excavated and stockpiled at the site as part of the IRA, and a total of approximately 2,250 gallons of product (oil/water mixture) was pumped from the trenches by

Cyn Environmental Services, as part of the IRA on July 31 and August 1, 1997, and a total of 705 gallons of separate-phase product has been pumped from the recovery wells since that time.

As part of a Release Abatement Measure (RAM) currently ongoing at the site, a bioremediation program, which was described in detail in several previous submittals by IES, began operating in April of 1997, and has been operating since that time. In addition, a total of 114 tons of waste oil contaminated soil was excavated and removed from the site as part of a RAM addendum in October of 1998, and approximately 2,000 gallons of contaminated groundwater was pumped from the excavation at that time. RAM Status reports have been submitted to the DEP every six months since the initiation of the RAM.

Finally, a "Risk Characterization" for the subject site was completed by IES as part of this Phase II investigation. This risk assessment included Hazard Identification, Exposure Assessment, a Characterization of Risk of Harm to Human Health, and an Uncertainty Analysis. The conclusion of the Risk Assessment is that a condition of No Significant Risk to health and public welfare **has not yet been achieved** at the site, based upon exceedances of Method 1 standards in the soil and groundwater as detailed in this report, as well as the presence of separate-phase product in monitoring well B-10.

The Risk Characterization also concluded that a condition of No Significant Risk to Safety **does exist** at the site; and a condition of No Significant Risk to the Environment **does exist** at the site, based on a Stage I Screening. In summary, the overall conclusion of the Risk Characterization is that a condition of No Significant Risk to health and public welfare has not yet been achieved at the subject site.

Based on the information contained in this report, as well as 310 CMR 40.0840(1), the conclusion of this report is that "Comprehensive Response Actions are necessary at the site to achieve a Response Action Outcome as described in 310 CMR 40.1000". Therefore, a Phase III study is required for the identification, evaluation and selection of Comprehensive Remedial Action Alternatives as described in 310 CMR 40.0850.

Report Completion Statement

As part of this Phase II Comprehensive Site Assessment, a Comprehensive Response Action Transmittal Form & Phase I Completion Statement (BWSC-108), has been completed pursuant to 310 CMR 40.0836. A copy of this form is included under separate cover.

In accordance with 310 CMR 40.0836(3)(a), it is the opinion of Daniel G. Jaffe, Licensed Site Professional (#2347) that this Phase II Report conforms with the applicable Phase II requirements and any approval conditions specified by the Department, meets the Phase II performed standards, and specifies the Phase II outcome under 310 CMR 40.0840.

Finally, in accordance with 310 CMR 40.0836(3)(b), a copy of the certification of the submittal required by 310 CMR 40.0009 is included as Item "J" in the aforementioned Comprehensive Response Action Transmittal Form & Phase I Completion Statement. A copy of this form is included in **Attachment "H"** and the original is submitted under separate cover.

Public Involvement Activities

The required Public Involvement Activities, following the completion of the Phase II report will include notifying the Boston Mayor's Office and the Boston Health Department of the availability of the Phase II Initial Site Investigation Report as outlined in 310 CMR 40.1403(3)(e). Copies of the letters to the municipal officials are included in **Attachment "I"** of this report.

Limitations

1. The purpose of this Phase II Comprehensive Site Assessment is to address the presence of a release of oil or hazardous materials at the subject site. The information obtained from sub-contractors, personal interviews, public records, and maps is subject to the personal recollection of those persons interviewed, and the availability and accuracy of the records on file with the State and municipal agencies. IES not be responsible for errors resulting from incorrect information provided by these sources.

2. This report was designed to assess the physical characteristics of the Site with regard to the likelihood of a release or threat of release of oil or hazardous materials and no attempt was made to investigate the regulatory compliance of the Site regarding Federal, State, or Local Laws and Regulations.
3. Our conclusions are based on the contents of this report and are a result of the interpretation of the existing data that was compiled.
4. If additional historical or analytical data becomes available, IES shall reserve the right to review this material to determine if the conclusions in this report are to be modified or updated.
5. Other than specified in this report, IES has not made any attempt to definitively determine any impact that any release or threat of release, from the subject site, has on any surrounding properties nor has IES made any attempt to definitively determine any impact that any release or threat of release, from any surrounding properties, has on this subject site, therefore, if determination of said impacts are required by the Client, and in-depth subsurface exploration program must be undertaken and IES further recommends consultation with an attorney be initiated to determine the potential for liabilities.
6. Any laboratory analysis of samples collected by IES, at or beneath the site, was completed by independent laboratories. Unless otherwise noted in this Report, IES has accepted their data at face value without additional verification. No warranty the analytical results or procedures is expressed or implied by IES. Laboratory analyses are limited to those discussed in the report unless otherwise specified.
7. IES's completion of this project was performed in accordance with generally accepted practices of other consultants undertaking similar studies at the same time and in the same geographical area. IES observed a degree of care and skill generally exercised by other consultants under similar circumstances and conditions. IES's findings and conclusions must be considered not as scientific certainties, but rather as our professional opinion concerning the significance of the

limited data gathered during the course of this project. No other warranty, expressed or implied, is made. IES does not and can not represent that the sites does not contain any hazardous substances, contaminants, pollutants, petroleum hydrocarbons, or any other latent conditions beyond that observed by IES during the course of this Project. The conclusions presented in this Report were based solely upon the services described therein, and not on scientific tasks or procedures beyond the scope of the described services or the time and budgetary constraints imposed by the Client.

ATTACHMENT "A"
FIGURES



**USGS NEWTON, MA
 QUADRANGLE**
 1575 VFW PARKWAY,
 WEST ROXBURY, MA
 IES PROJECT # 797-159

APPROXIMATE SCALE

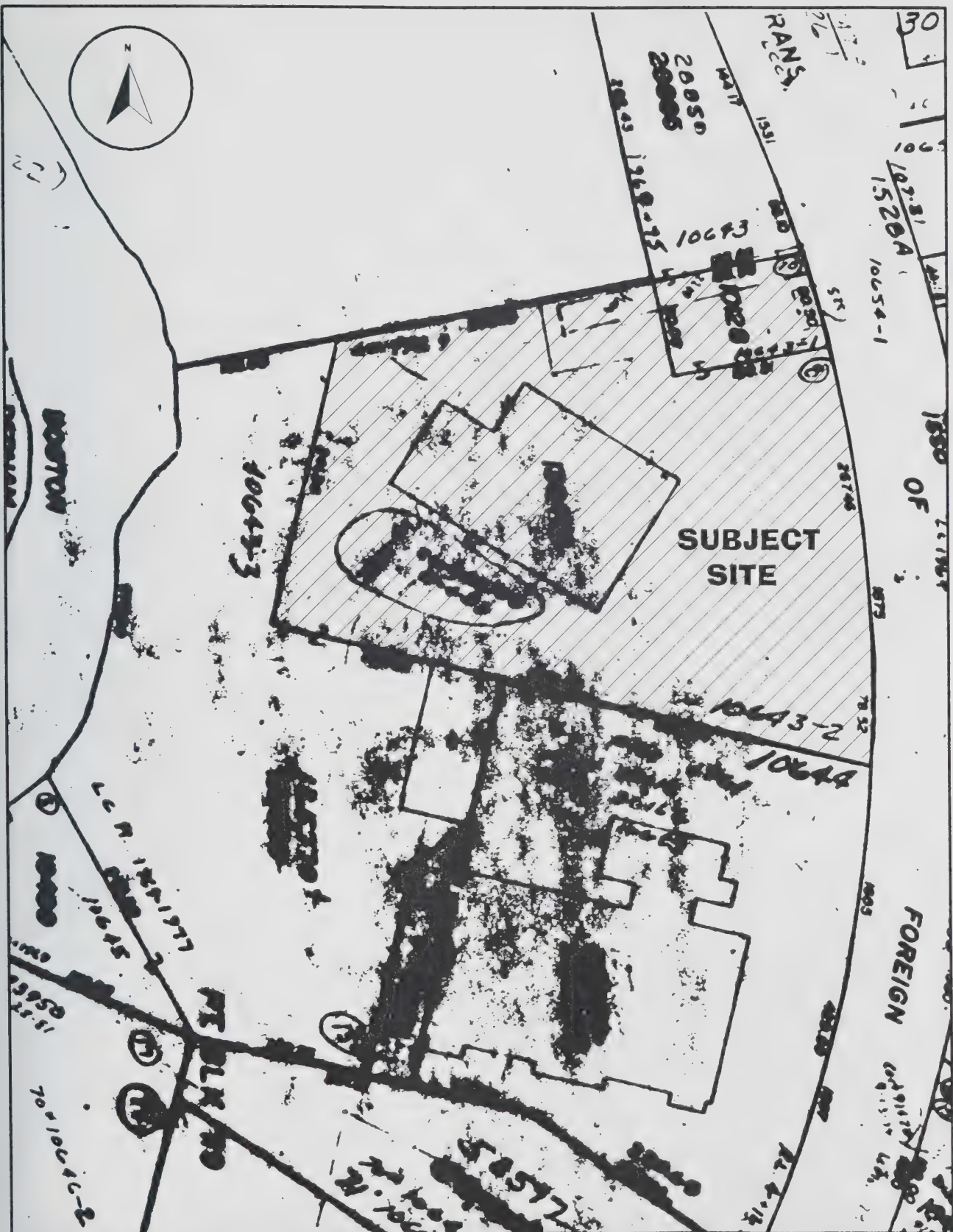
1,000 0 2,000 FT

CONTOUR INTERVAL 10 FEET
 DATUM MEAN SEA LEVEL

FIGURE 1



IES, INC.
 ENVIRONMENTAL CONSULTANTS



BOSTON ASSESSOR'S
PLAN #20343

1575 VFW PARKWAY
WEST ROXBURY, MA
IES PROJECT # 797-159

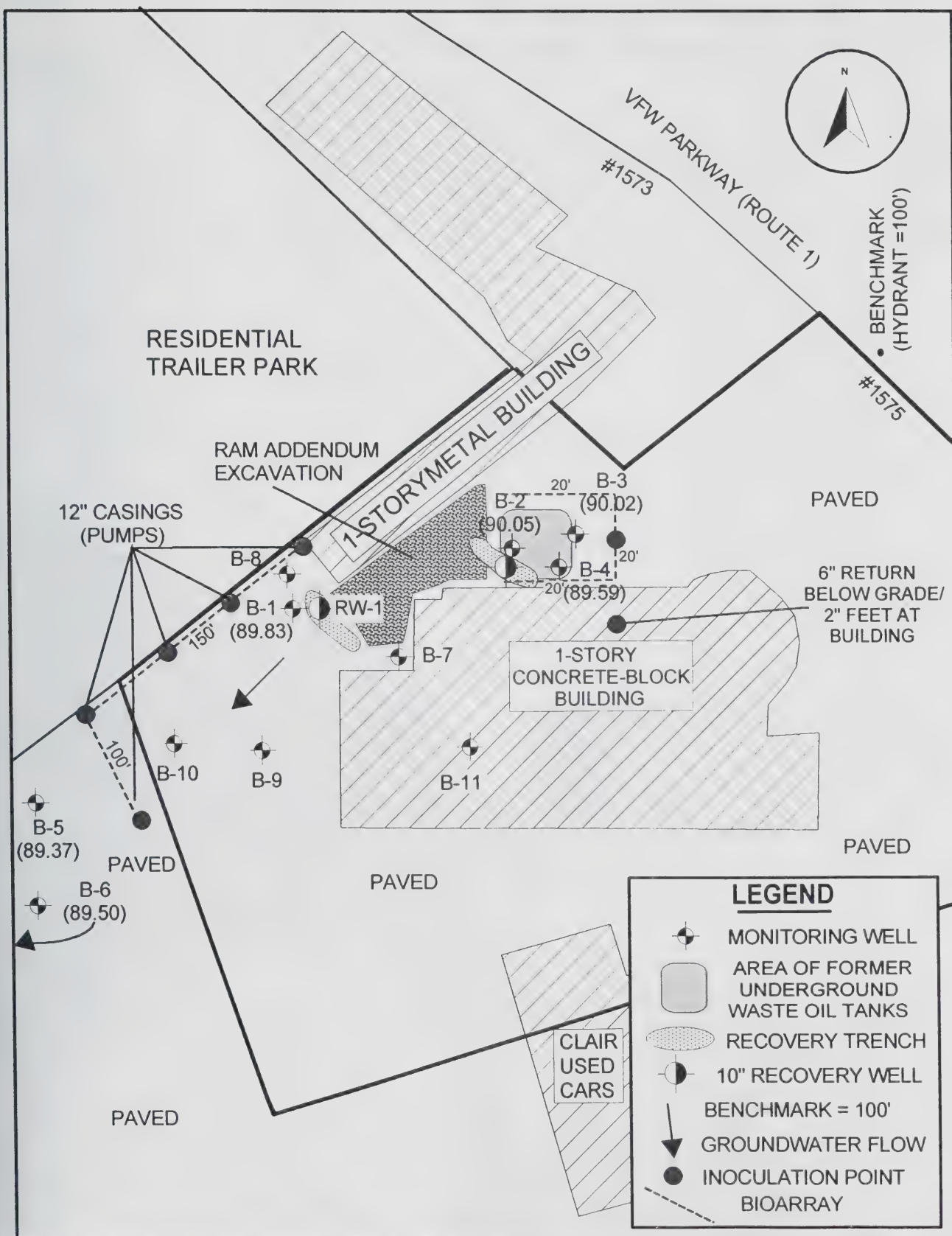
APPROXIMATE SCALE



FIGURE 2



IES, INC.
ENVIRONMENTAL CONSULTANTS

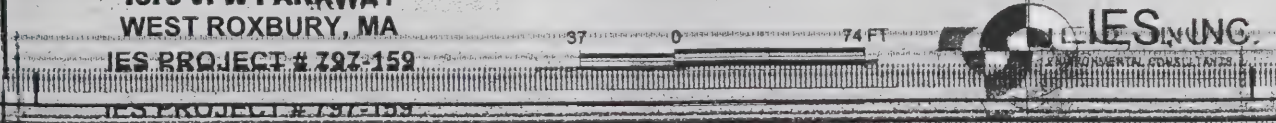


SITE PLAN
1575 VFW PARKWAY
WEST ROXBURY, MA
IES PROJECT # 797-159

APPROXIMATE SCALE

FIGURE 3

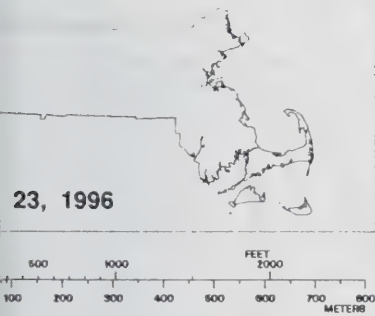
IES INC.



NAME:
ERTY
VFW PARKWAY
ROXBURY, MA
32n 71 10 25ew

MA DEP - Bureau of Waste Site Cleanup

Site Scoring Map: 500 feet & 0.5 Mile Radii



- Potentially Productive Medium Yield Aquifer
- Potentially Productive High Yield Aquifer
- NOT Potentially Productive Medium Yield Aquifer
- NOT Potentially Productive High Yield Aquifer
- EPA Designated Sole Source Aquifers
- DEP Approved Wellhead Protection Area - ZONE 2
- Interim Wellhead Protection Area
- Public Surface Water Supply
- Lakes, Ponds, Other Fresh Water Features
- Bays, Estuaries, Other Salt Water Features
- Fresh Water Non-Forested Wetlands
- Salt Water Wetlands
- State, Federal, Municipal, Nonprofit and Private Open Space and Recreational Facilities
- Areas of Critical Environmental Concern
- DEP Permitted Solid Waste Facilities
- NHESP Estimated Habitats of Rare Wetlands Wildlife 1995 - for use with Wetlands Protection Act ONLY

- 20 90 State, U.S., Interstate Routemarkers
- Interstate Highway
- U.S. Highway
- State Highway
- Other Roads
- Municipal Boundary
- County Boundary
- Train
- Pipeline
- Aqueduct
- Major Drainage Basin
- Sub Drainage Basin
- Zone of Contribution
- Public Water Supply - Groundwater
- Public Water Supply - Surface Water
- Non Community Public Water Supply
- Certified Vernal Pools



SCALE 1:15000

Scale 1:15000
This map is for informational purposes only. It is not to be used for legal or regulatory purposes. The map is not to be used for legal or regulatory purposes. The map is not to be used for legal or regulatory purposes.



Environmental FirstSearch

.5 Mile Radius

Aquifer Sites

1575 VFW PKWY, WEST ROXBURY MA 02132



Source: 1994 U.S. Census TIGER Files

- Target Site
- Identified Site
- Multiple Sites
- Receptor
- NPL, SWL or Haz. Waste
- Target ZIP Boundary
- Adjacent ZIP Boundary
- Railroad

Black Rings Represent 1/4 Mile Radii
Red Ring Represents 500 ft. Radius

- Water Bodies
- Public Water Supply
- Dep Zone II Boundaries
- High Yield Aquifers:**
 - Potentially Productive
 - Not Potential Drinking Source
- Medium Yield Aquifers:**
 - Potentially Productive
 - Not Potential Drinking Source

Other Aquifers:

- EPA Sole Source
- ACEC's:**
 - Area of Critical Environmental Concern
 - Protected Open Spaces
 - Estimated Habitats of Rare Wetlands Wildlife
 - Vernal Pool

Floodplains:

- 100 Year
- 500 Year

Other:

- Wetlands

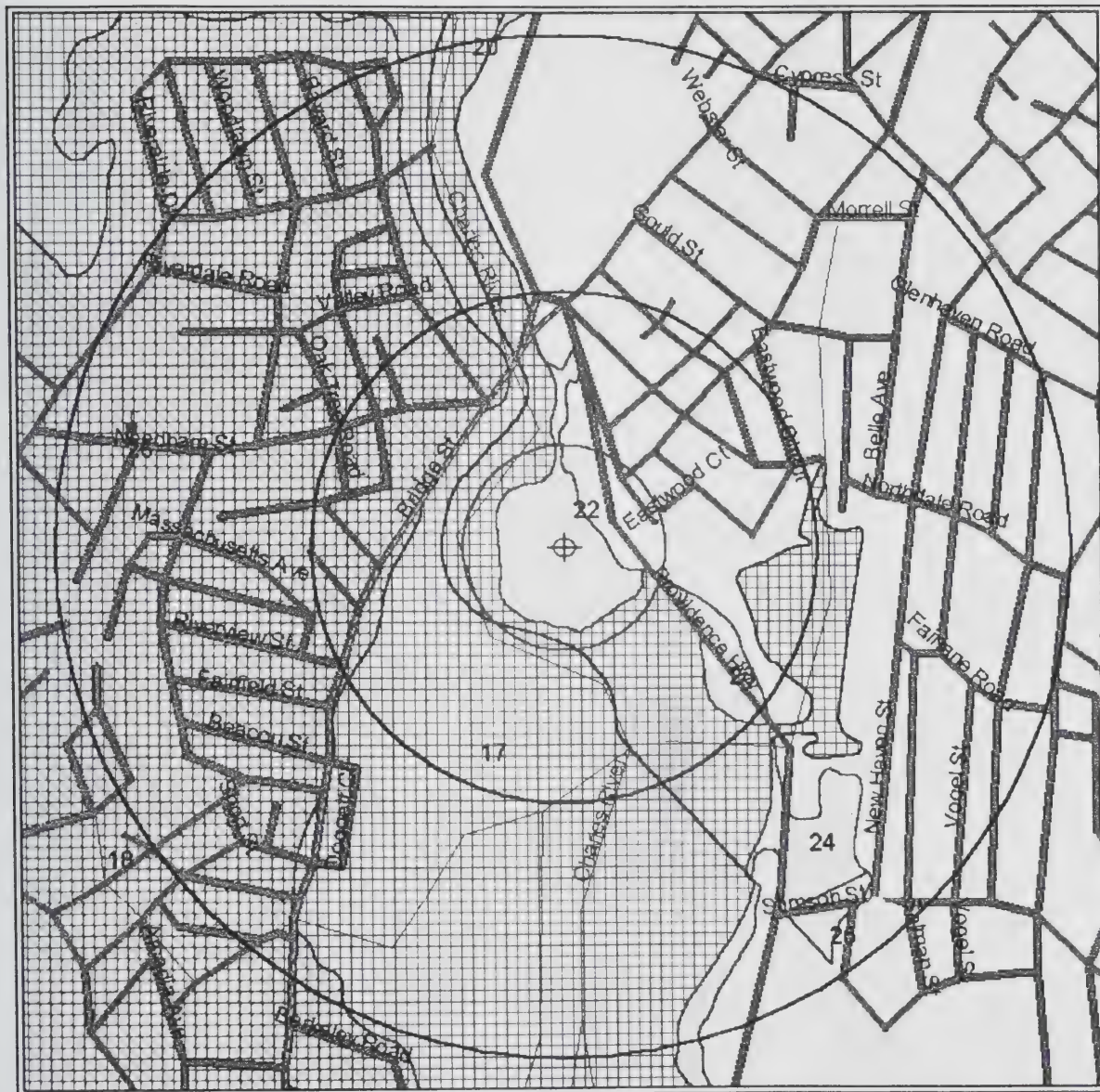


Environmental FirstSearch

.5 Mile Radius

Floodplains

1575 VFW PKWY, WEST ROXBURY MA 02132



Source: 1994 U.S. Census TIGER Files

- Target Site
- Identified Site
- Multiple Sites
- Receptor
- NPL, SWL or Haz. Waste
- Target ZIP Boundary
- Adjacent ZIP Boundary
- Railroad

Black Rings Represent 1/4 Mile Radii
Red Ring Represents 500 ft. Radius

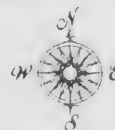
- Water Bodies
- Public Water Supply
- Dep Zone II Boundaries
- High Yield Aquifers:**
 - Potentially Productive
 - Not Potential Drinking Source
- Medium Yield Aquifers:**
 - Potentially Productive
 - Not Potential Drinking Source

Other Aquifers:

- EPA Sole Source
- ACEC's:**
 - Area of Critical Environmental Concern
 - Protected Open Spaces
 - Estimated Habitats of Rare Wetlands Wildlife
 - Vernal Pool

Floodplains:

- 100 Year
- 500 Year
- Other:**
 - Wetlands

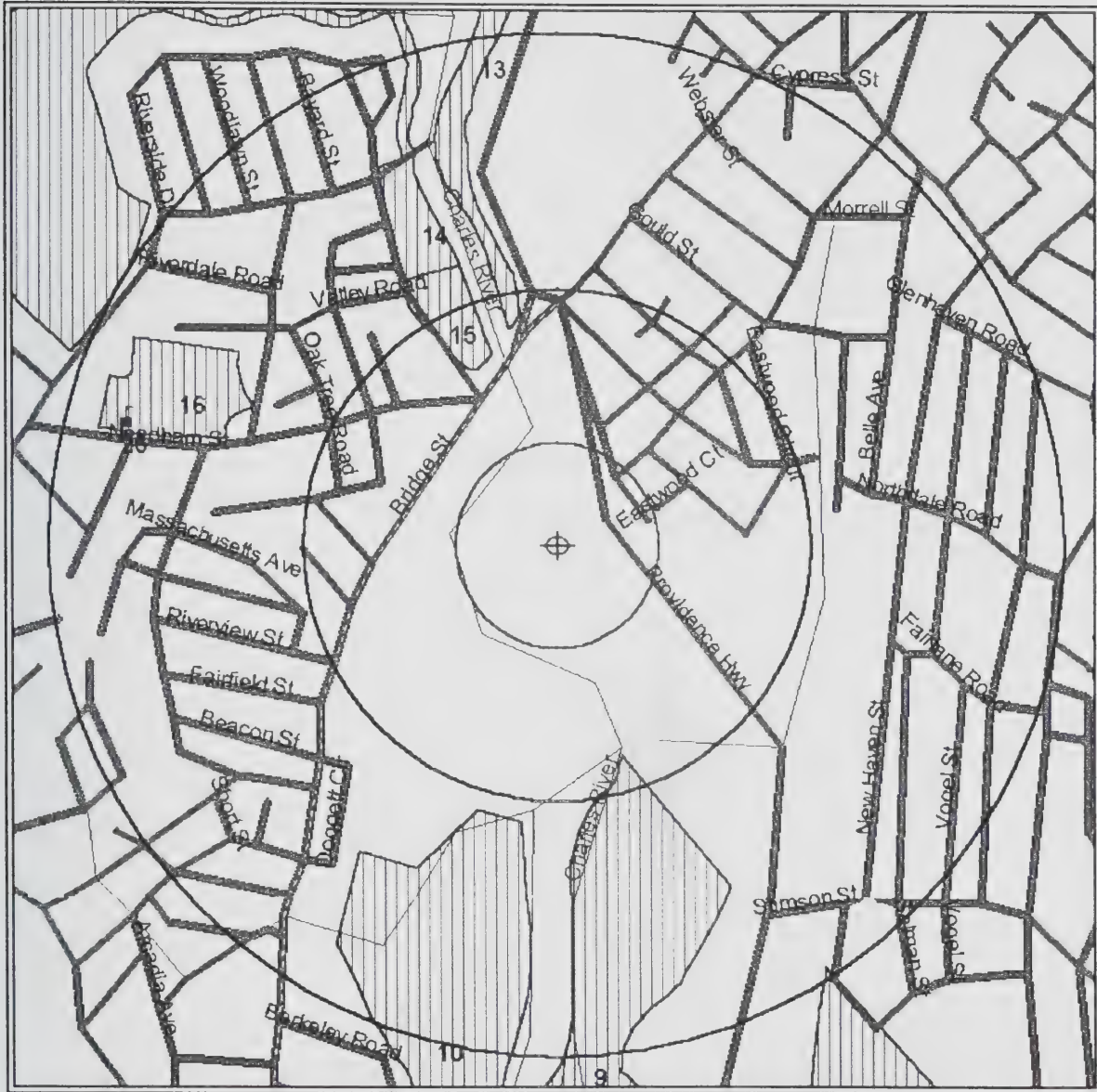


Environmental FirstSearch

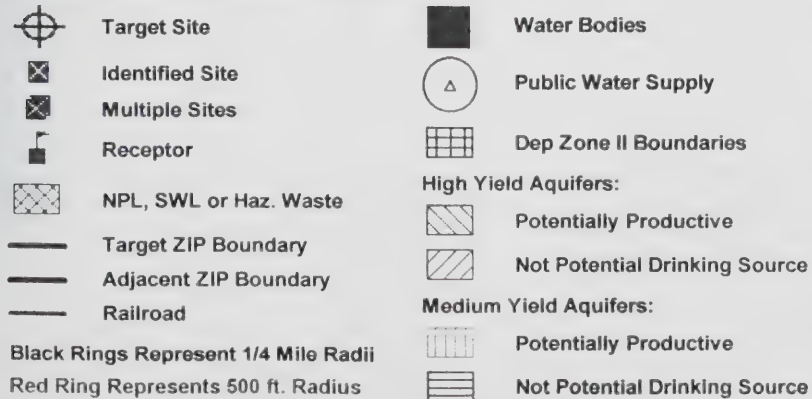
.5 Mile Radius

ACEC Sites

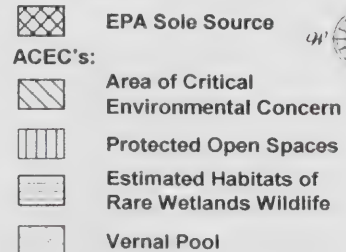
1575 VFW PKWY, WEST ROXBURY MA 02132



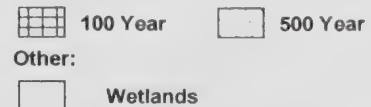
Source: 1994 U.S. Census TIGER Files



Other Aquifers:



Floodplains:



ATTACHMENT "B"
INFORMATIONAL SOURCES

Public Information Contacts

NAME	TITLE	AFFILIATION	TELEPHONE
r. John Shea	Director	Environmental Health	(617) 534-5966
s. Gertrude Delsoin	Clerk	Boston Fire Department	(617) 725-3336
r. David Nathan	Archivist	Archives & Records Mgmt.	(617) 364-8679
s. Holly Migliacci	File Review	DEP Northeast Regional Office	(978) 932-7600

References

"Bedrock Geologic Map of Massachusetts", E-an Zen, 1983.

"Bromley Atlas of West Roxbury" dated 1928, viewed at the Suffolk County Registry of Deeds

"Sanborn Atlas of Boston", dated 1929 (Revised to 1951), viewed at the Massachusetts State House Library.

"Phase I Site Assessment" reported dated August 2, 1996 by IES, Inc.

"Immediate Response Action (IRA) Transmittal" report by IES, Inc., dated April 18, 1997.

"Immediate Response Action Completion Statement" dated April 18, 1997, by IES, Inc.

"RAM Plan Transmittal Addendum" dated August 5, 1998, by IES, Inc.

"Release Abatement Measure Status Reports" dated September 28, 1997, April 2, 1998, and October 20, 1998 by IES, Inc.

DEP Bureau of Waste Site cleanup Site Scoring Map

0. City of Boston Building Department, Assessor's Office, Fire Prevention Office, Health Department

ATTACHMENT "C"

**IES STANDARD OPERATING PROCEDURES
SITE HEALTH & SAFETY PLAN**

IES STANDARD OPERATING PROCEDURES

SOIL BORINGS IN OVERBURDEN MATERIALS

INTRODUCTION:

Test Borings programs in unconsolidated materials may be conducted using a variety of drilling techniques. As most borings associated with site assessments are performed in conjunction with monitoring well construction, it is necessary to reduce or eliminate the potential for downhole contamination from outside or near-surface soils. Therefore, it is desirable to utilize a technique which does not require the introduction of drilling fluids into the borehole. It is for this reason that hollow-stem auger methods are most commonly used to collect subsurface soil samples.

The auger column or drill stem is comprised of a series of hollow auger sections, five feet in length which are easily disconnected. The open stem of the auger allows the borehole to be drilled while acting as a temporary casing to prevent the "spalling" of the borehole wall. In addition, discrete soil samples may be collected from the unconsolidated soil formation. The initial soil sample (0-2 feet) is generally collected from the test boring cuttings, unless the sampling plan requires a split-spoon sample at the surface. Finally, soil samples are collected from the borehole at 5 foot intervals (2 foot intervals if performing continuous sampling) utilizing a "split-spoon sampler".

PROCEDURE

1. Prior to initiating any work, the Health and Safety Plan (HASP) developed for the specific site activities should be reviewed by all field personnel. The indicated measures on the HASP should be communicated to all on-site personnel prior to conducting any field work. Any concerns not addressed in the HASP are to be brought immediately to the attention of the Health and Safety Officer or Project Manager. Personnel participating in the test boring program will dress with protective equipment appropriate for the anticipated conditions.
2. All test boring activities are to be inspected by a qualified IES Inspector or Project Manager. The Inspector is familiar with the test boring and sampling plan and is responsible for all drilling activities and QA/QC procedures. Test boring logs are to be completed by the drilling contractor. Headspace screening results, and other pertinent field notes are to be completed by the IES Inspector.
3. The drilling equipment is steam-cleaned prior to each use, including the augers and/or casing, drilling rods, samplers, auger forks, lifting hooks, and other equipment needed for installing the well. In addition, the IES Inspector is responsible for ensuring that all drill equipment has been properly cleaned and that the drill rig is free of leaks such as gasoline or diesel fuel.
4. Once the desired sampling depth has been reached (5 feet below grade and at subsequent 5 foot intervals), the center rod of the auger flight is withdrawn and the plug is replaced with a split-barrel, stainless-steel sampler. The IES Inspector shall ensure that the center rod and sampler are extended to the proper sampling depth.

5. Repeated blows of a 140 pound hammer weight, falling 30 inches are used to drive the sampler 18-24 inches beyond the base of the auger, into the undisturbed soils. Blow counts for each 6 inches of advance are recorded as a relative measure of the soil density. This data represents the "Standard Penetration Test" described in ASTM D 1586.
6. The description of the soil sample, stratigraphy, blow counts, and drilling parameters are recorded on the test boring log. Soil samples, when recovered, are placed in appropriate containers for PID screening and a duplicate sample is placed in a separate container for laboratory analysis, if required.
7. The auger cuttings from drilling operations will remain on-site. Soil cuttings exhibiting a PID reading of ≥ 10 ppm or otherwise visibly contaminated or oily, will be segregated and either containerized (55 gallon drum) and labeled, or placed on and covered with 6-mil polyethylene plastic sheets. Those cuttings with PID readings < 10 ppm, will be properly discarded on-site or returned to the test boring as native fill material.

IES STANDARD OPERATING PROCEDURES

MONITORING WELL INSTALLATION

INTRODUCTION:

The proper installation of monitoring wells is an essential element of monitoring groundwater quality as part of a hydrologic or site assessment investigation. Installation of monitoring wells typically consists of a 2 inch inside diameter, Schedule 40 PVC well screen (0.1 inch slot size) and a solid riser pipe. The screened interval is usually 10 feet in length and is centered at the observed groundwater surface at the time of installation. One inch or four inch ID screen and riser may also be used depending on the constraints and objectives of the drilling program. Refer to DEP Policy #WSC-310-91, and the EPA's RCRA Groundwater Monitoring Technical Enforcement Guidance Document (TEGD), for guidance regarding proper well installation.

The installation of bedrock wells will require the introduction of drilling fluids, which should be free of contamination. Sampling of groundwater at specific depths within an aquifer, or bedrock wells, will require special attention regarding the location of the screened interval.

PROCEDURE

1. Upon completion of the test boring, the pre-assembled well screen and riser, with bottom plug siltation trap, is inserted into the borehole. However, it is more common to insert the well into the hollow stem auger or casing, as removing the auger flights can cause the surrounding formation to prematurely collapse on the well screen.
2. The well assembly is positioned at the desired depth and the annular space between the sidewall and well casing assembly is then backfilled with a clean, well sorted silica sand to a depth of at least one foot above the well screen/riser connection. The screen and riser pipe are installed to be vertically plumb, unless another configuration is desired.
3. Once the sand filter pack is placed at the proper depth below grade (measured with tape), a divider seal, most commonly bentonite pellets, is inserted into the annular space until a 6-12 inch thick impermeable seal is formed around the casing.
4. The method for backfilling the remainder of the annular space is determined by the qualified IES Inspector. Typically, native material removed from the borehole having a PID reading below 10 ppm is used to backfill the remaining annular space. Alternative backfill materials include concrete slurry or bentonite/water mixtures. The well riser is then fitted with a top plug and a locking protective casing or road box.
5. The protective casing or road box is securely cemented in place over the well, and is either flush with the surface, or greater than one foot above the surface for locations with difficult access or in vegetated areas. The cement seal is at a minimum one foot thick, and is cemented flush with the pavement surface. If used, other protective casings should be grouted in place at least 0.5 feet above grade and identified with flagging.

IES STANDARD OPERATING PROCEDURES

JAR HEADSPACE SCREENING - PHOTOIONIZATION DETECTOR

INTRODUCTION:

Sample materials collected in the field are placed in tightly sealed, clean glass jars to be screened for volatile organic compounds using a photoionization detector (PID). IES uses the HNU Model PI-101, or a Thermo Environmental Organic Vapor Meter (OVM) Model 580B, when field conditions such as moisture is a potential variable. The PID can be used to detect organic or inorganic compounds with specific ionization potentials, however, individual compounds cannot be identified. Therefore, the results for total volatile organic concentrations are expressed as parts per million (ppm) of an equivalent amount of benzene. The detection limit of the PID is typically 0.1 ppm. When the PID is used to screen for compounds which are outside of the detection range (ionization potential or IP) of the 10.2 eV lamp, the appropriate lamp shall be selected and used in accordance with the manufacturer's instructions.

The PID instrument to be used in the field must be maintained and calibrated in accordance with the manufacturer's specifications either daily or after 10 samples, when appropriate. IES maintains individual maintenance logs for each PID. Prior to use in the field, the PID is calibrated using a Benzene standard or equivalent (Isobutylene).

PROCEDURE:

1. Prior to use in the field, the photoionization detector (PID) is to be calibrated in accordance with the manufacturer's specifications.
2. Place the sample in a 12-16 ounce, wide-mouth, glass container (wide-mouth jar) until the jar is approximately half-filled. The sample jar used for screening is usually a duplicate of the same sample to be submitted for laboratory analysis. Place one or two sheets of thick aluminum foil over the mouth of the jar and place a screw cap on the jar to create an effective seal. Vigorously shake the sample jar for 15 seconds and let stand at temperatures above 50°F prior to screening. Sample containers less than 8 ounces are not recommended for use.
3. After 10-15 minutes of equilibration time, shake the sample jar a second time and position the container for sampling. Carefully puncture the aluminum foil seal with the PID probe tip, making sure that the probe tip does not come in contact with the sample material, or standing water. Observe and record the PID reading and discard the sample and container in an appropriate manner.
4. Observe the instrument and record the highest reading (unless maximum hold feature is available). The meter reading will most often peak within five seconds and steadily decrease as ambient air is introduced into the medium. If erratic variation is noted in the meter reading (usually due to elevated VOC levels or moisture), the sample will be re-tested.
5. A PID with an LED/LCD display may not be able to discern maximum headspace response unless equipped with a "maximum hold" feature or strip-chart recorder. Any deviations or

departures and/or additions from the above procedures must be consistent with the MCP (310 CMR 40.0017) or IES policy.

6. Soil samples collected for PID screening are not to be submitted for laboratory analysis, and should be a duplicate of the sample to be tested. This is due to the fact that VOC's are lost during the screening activity, and would not allow for accurate laboratory analysis of VOC's in the sample.

IES STANDARD OPERATING PROCEDURES

MONITORING WELL SAMPLING USING A BAILER

INTRODUCTION:

Groundwater within a monitoring well casing, and in proximity to the well, may be stagnant or not representative of actual aquifer quality. To obtain a representative groundwater sample, the well must be pumped or bailed until it is thoroughly flushed of standing water and silt, and contains water directly from the aquifer. Wells may be purged and sampled with a pump from the ground surface, with a submersible pump or with a disposable or dedicated bailer, depending on the specific requirements of the sampling program. Bailers are generally preferred for collecting samples where the risk of stripping volatiles is of concern. Pumps are useful for purging large volumes of water from deep wells or when a sample from a discrete depth below the groundwater surface is desired. Note that monitoring wells are sampled at least 72 hours (3 days) after well installation to allow for equilibration of the aquifer. Please refer to the DEP Policy #WSC-310-91 for additional instructions regarding sampling of groundwater monitoring wells.

The sampling of monitoring wells is the primary means by which the chemical characteristics of the aquifer can be determined. Therefore, it is crucial that care be taken in the development and subsequent sampling of monitoring wells. The following is a summary of the methods used to develop or evacuate monitoring wells prior to sampling, and sampling of groundwater.

PROCEDURE:

Well Evacuation

1. Prior to initiating any work, the Health and Safety Plan (HASP) developed for the specific site activities should be reviewed by all field personnel. The indicated measures on the HASP should be communicated to all on-site personnel prior to sampling of the monitoring wells. Any concerns not addressed in the HASP are to be brought immediately to the attention of the Health and Safety Officer or Project Manager. Personnel participating in the sampling will be responsible for protective equipment appropriate for the anticipated conditions.
2. Decontaminate all equipment to be used in the performance of the activities. Decontamination should be performed by alternately rinsing all equipment with methanol and distilled water and vigorously scrubbing the equipment with a clean brush. Please see the IES Standard Operating Procedure for Decontaminating Sampling Equipment for more information.
3. The extent that contamination may be known at a given site, monitoring wells should be sampled in order from "least contaminated" to "most contaminated".
4. Screen the well headspace with a photoionization detector (PID) or other appropriate instrumentation to confirm that concentrations of potential contaminants are within acceptable limits.
5. Test the well for accumulation of non-aqueous phase liquid (NAPL or DNAPL) using a pre-cleaned interface probe or a transparent disposable/glass bailer. If present, collect a sample of

the NAPL and place in an appropriate container. This sample should be kept away from the remaining groundwater samples to prevent contamination of the samples

- 6 Measure and record the depth to NAPL (if present), depth to water, and the total depth of the well. If NAPL is present, sampling for dissolved phase contaminants should generally not be performed. In addition, if sampling is to be performed, appropriate measures should be taken to assure that any NAPL or grossly contaminated groundwater removed from a monitoring well is returned to the same well, or disposed of in a labeled 55 gallon drum for off-site disposal.
- 7 Calculate the volume of saturated well casing and the volume of water which will be removed to assure sufficient well evacuation. The volume of water in the well can be calculated using the following formula:

$$v = \frac{(\pi r^2 h)}{c}$$

where:

v = one well volume of water (gallons)

$\pi = 3.14$

r = the radius of the well or one half of the diameter (inches)

h = the height of the water column in the well (inches)

c = 231 cubic inches per gallon, constant to convert cubic inches to gallons

- 8 Using a bailer, attach the bailer to a clean nylon rope or cable for lowering into the well. Lower the bailer slowly into the well until it contacts the water surface. Allow the bailer to sink and fill with a minimum of surface disturbance. Raise the bailer to the surface, and do not allow the bailer line to contact the ground. Drain the bailer contents into a bucket or filtering vessel (for dissolved metals analysis). Record the pH, conductivity, and temperature values (when requested) in accordance with the instrument manufacturer's specifications, and record final values.
- 9 Purging should continue until a minimum of three well volume have been removed, and a stabilization in silt content of the evacuated water has been achieved.
- 10 Allow at least 10-30 minutes for the well to equilibrate prior to sampling. Discard the bailer line and discard or decontaminate the bailer or pump in accordance with the IES Standard Protocol for Decontamination of Sampling Equipment.

Well Sampling

- 1 Sampling of monitoring wells will be conducted only with clean, decontaminated stainless steel or Teflon sampling equipment, plastic tubing (for pumps), or with disposable bailers. Disposable bailers shall not be re-used for any purpose, and will be properly discarded on-site after use.
- 2 All samples should be collected and placed in the appropriate containers in order of decreasing sensitivity to volatilization and degree of contamination (i.e., sample the "cleanest wells" prior

to the "contaminated "wells" in order). The following order should generally be used in the collection of groundwater samples:

- * VOC's
- * Semi-Volatiles (PAH's)
- * Petroleum Hydrocarbons
- * Metals
- * PCB's
- * Other Parameters

3. Minimize agitation of sample during collection to prevent possible volatilization of compounds present in the sample.
4. Care must be taken to eliminate entry of, or contact with, any substance other than the water sample and the interior surface of the sampling container.
5. Samples submitted for VOC analysis should not contain any air bubbles, and should be replaced if bubbles are observed.
6. Samples submitted for dissolved metals analysis should be filtered in the field, using IES's manual filtration and pump system. Acidification of the sample should not be performed until the sample has been properly filtered in the field. Please note that under specific sampling conditions, this sample collection procedure may vary. As a result, any changes to the standard sampling protocol must be noted on the field sampling log.
7. Lower the bailer slowly until the groundwater surface is encountered and allow to sink until the bailer is filled. Slowly raise the bailer to the surface and remove the bailer from the well.
8. The sample collected with the bailer is then transferred carefully to the selected container. When full, all sampling containers should be securely capped, wiped off, appropriately labeled, and refrigerated until their delivery to the laboratory.
9. The chain-of-custody is completed with the appropriate signatures, and forwarded with the samples to the laboratory as soon as possible.

IES STANDARD OPERATING PROCEDURES

SAMPLE PRESERVATION AND CHAIN-OF-CUSTODY

INTRODUCTION:

The samples collected from the site must be preserved to ensure sample integrity for screening and laboratory analysis. This standard protocol has been adapted from DEP Policy #WSC-310-91 (Standard References for Monitoring Wells); DEP Policy #WSC-401-91 (Interim Site Investigation Protocol Document); the EPA's "Guidelines Establishing Test Procedures for the Analysis of Pollutants" (40 CFR 136); and applicable ASTM standards

The purpose of the chain-of-custody is to ensure that the sample preservation techniques are consistent with the compounds being tested, and that the integrity of the samples cannot be questioned. The IES standard preservation and chain-of-custody protocols are not intended to be all inclusive, and certain samples may require specific sample preservation. However, this protocol is intended to cover the majority of the media and analyses performed as well as the chain-of-custody procedures employed at the majority of sites. The following is a description of the methods to be used for sample preservation, and the chain-of-custody for all sampling projects

PROCEDURE

- 1 Prior to initiating any work, the Health and Safety Plan developed for the specific site activities should be reviewed by all field personnel. Personnel performing the sampling activities will wear the appropriate level of personal protective equipment for the anticipated conditions.
- 2 All sample containers must be prepared in the laboratory in a manner consistent with USEPA protocols. Sample containers are to be used once, then discarded. Under no circumstances should a soil, water or gaseous media which has been collected for analysis be placed in a previously used sample container unless that container has been re-cleaned and preserved by a certified laboratory. Please note that specific sample container preparation and preservation is required for the DEP's EPH/VPH analysis, and the DEP guidance should be consulted for procedures specific to this analysis.
- 3 Sample containers should have prepared labels for each container. The label should include the sample identification, date, and time of collection, sample parameters to be analyzed, any preservatives used, and the name of the sample collector. Upon collection of the sample(s), documentation on the chain-of-custody should include at least the following:
 - Date and time of sampling
 - Sampling location
 - Sample bottle identification
 - Specific sample collection measures
 - A unique identification of each sample
 - The name, address, and telephone number of the sampler and the shipper
 - The type and method of analyses requested

- The date and time of sample collection and transfer of custody
 - The name of those responsible for receiving the samples at the laboratory
- 4 In some cases, field filtration of samples, or other specific sample collection or preservation techniques may be required. Prior communication to the laboratory is necessary to ensure proper collection of the sample, and reduce the risk of sample contamination. In addition, groundwater samples collected for VOC's should not be filtered in the field prior to sample collection
 - 5 Holding times for samples are specified for each type of analysis, and usually begins at the time of sample collection. This determination must be made prior to sampling to allow for proper shipment to the laboratory to avoid exceeding the holding time. If the holding time is exceeded, the sample cannot be used and must be replaced with a second sample. Holding times may also vary with the regulatory basis under which analyses are conducted, and the laboratory should be consulted prior to sample collection, to properly schedule work
 - 6 Sample containers are most often packed in plastic, insulated "coolers" with an ice-pack or crushed ice, and delivered in this condition to the laboratory. Sample containers which are considered highly hazardous may require special handling and packing for shipment (consult with the laboratory). All applicable paperwork should also be enclosed with the samples and included in the cooler, and the shipping container (or cooler) locked or taped shut
 - 7 Upon receipt of the samples at the laboratory, any laboratory identification numbers should also be included on the chain-of-custody form. Finally, those responsible for receipt of the samples should be indicated on the chain-of-custody form as well as the date and time of the sample delivery

IES STANDARD OPERATING PROCEDURES

DECONTAMINATION OF SAMPLING EQUIPMENT

INTRODUCTION:

In most cases, sampling equipment will either be dedicated on-site or disposed of following use in a specific well, eliminating the need for decontamination of sampling equipment. In those cases where decontamination of sampling equipment is required, the method chosen will be one that removes contaminants from the equipment without interference with the chemical analyses to be performed. Deviations from the standard policy should be noted in the sampling field log. The general decontamination methodology for soils laboratory and field decontamination procedures are described below.

PROCEDURE:

1. Wash equipment with a non-phosphate detergent solution (e.g. Alconox) and a brush
2. Rinse thoroughly with de-ionized water
3. Rinse thoroughly with reagent-grade methanol
4. Repeat procedure between each sampling location. In addition, rinse the sample container with the groundwater in the well prior to sampling.
5. If sampling for dissolved metals is being performed, an additional rinse with a weak hydrochloric acid solution and de-ionized water should be performed
6. If sampling for PCB's is being performed, an additional rinse with a weak hexane solution and de-ionized water should be conducted.
7. Care should be taken to ensure that no rinse waters migrate to environmental sensitive areas (should be placed in a plastic pail), and discharged on-site.

IES, INC.
HEALTH AND SAFETY PLAN

For
Phase II Comprehensive Site Assessment
1575 VFW Parkway
West Roxbury, MA

A. SITE DESCRIPTION

Dates of On-site Activities:	December 1998, January 1999
Location:	1575 VFW Parkway, West Roxbury, MA
Release Tracking Numbers (RTN):	3-2126 & 3-14019
Hazards:	Physical – ingestion, dermal absorption, and inhalation of dust and vapors
Area Affected:	Soil and groundwater between and to the west of the two site buildings
Surrounding Population:	Commercial and Residential
Current Site Use:	Automobile dealership and associated repair garage
Weather Conditions:	Cloudy, 35° F

B. WORK OBJECTIVES

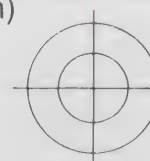
The objective of this project is to advance test borings at the site in the area of waste oil contamination in the soil and groundwater, which was previously identified during a 1996 "Phase I – Limited Site Assessment" by IES. Geoprobe is to be advanced in the area of contamination, and cross gradient locations in order to better delineate the limits of the Disposal Site.

C. ON-SITE ORGANIZATION AND COORDINATION

The following personnel are designated to carry out the stated functions on-site:

Project Team Leader:	Daniel Jaffe
Project Team Leader II:	N/A
Scientific Advisor:	Daniel Jaffe
Site Safety Officer:	Daniel Jaffe
Record Keeper:	Daniel Jaffe
Field Team Leader:	Kerry Asetta
Field Team Members:	Kerry Asetta

(Note: One person may carry out more than one job function)



IES, INC.

All personnel arriving or departing the Site should check in with the Record Keeper. All activities affecting the Test Boring activities must be cleared through the Project Team Leader and/or Site Safety Officer.

D. ON-SITE CONTROL

IES has been designated to coordinate access control and security on-site. Controls will consist of the existing chain-link fence, which separates the site from the northerly abutting residential trailer park.

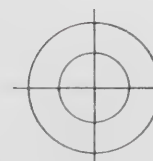
E. HAZARD EVALUATION

According to site assessment data, the contaminants of primary concern include EPH and VPH in both soil and groundwater. The area of greatest concern is down gradient of the former underground tanks, which were the source of the contamination; and down gradient of two existing recovery wells (RW-1 and RW-2), where over 30 inches of separate-phase product (waste oil) had previously been detected.

The following Oil and Hazardous Materials have been detected in the soil and/or groundwater, and include the calculated Exposure Point Concentration (EPC) as detailed in Section IV of this report.

Table 1
Summary of Site OHM

SUBSTANCE	EXPOSURE POINT CONCENTRATION	PRIMARY HAZARDS
TPH	20.2 mg/l (groundwater)	See Attachment "G"
	3,288 mg/kg (soil)	
C ₉ -C ₁₈ Aliphatics	1,495 µg/l (groundwater)	See Attachment "G"
	37,067 µg/kg (soil)	
C ₁₉ -C ₃₆ Aliphatics	8,295 µg/l (groundwater)	See Attachment "G"
	1,240,960 µg/kg (soil)	
C ₁₁ -C ₂₂ Aromatics	10,200 µg/l (groundwater)	See Attachment "G"
	174,460 µg/kg (soil)	
C ₅ -C ₈ Aliphatics	207 µg/l (groundwater)	See Attachment "G"
	46,000 µg/kg (soil)	
C ₉ -C ₁₂ Aliphatics	920 µg/l (groundwater)	See Attachment "G"
	12,677 µg/kg (soil)	
C ₉ -C ₁₀ Aromatics	725 µg/l (groundwater)	See Attachment "G"
	60,733 µg/kg (soil)	
Benzene	34.4 µg/l (groundwater)	See Attachment "G"
	37 µg/kg (soil)	
Toluene	8.95 µg/l (groundwater)	See Attachment "G"
	1,590 µg/kg (soil)	
Ethylbenzene	19.5 µg/l (groundwater)	See Attachment "G"
	1,130 µg/kg (soil)	
Xylenes	123.3 µg/l (groundwater)	See Attachment "G"
	9,660 µg/kg (soil)	
Arsenic	11.7 µg/l (groundwater)	See Attachment "G"
Barium	350 µg/l (groundwater)	See Attachment "G"
Chromium	12.2 µg/l (groundwater)	See Attachment "G"
Lead	70.4 µg/l (groundwater)	See Attachment "G"
Acenaphthene	651 µg/kg (soil)	See Attachment "G"
Fluoranthene	639 µg/kg (soil)	See Attachment "G"
2-Methylnaphthalene	3,560 µg/kg (soil)	See Attachment "G"
Naphthalene	3,180 µg/kg (soil)	See Attachment "G"
Phenanthrene	1,030 µg/kg (soil)	See Attachment "G"
Pyrene	1,430 µg/kg (soil)	See Attachment "G"
1,4-Dichlorobenzene	9.6 µg/kg (soil)	See Attachment "G"
1,2-Dichlorobenzene	1.8 µg/kg (soil)	See Attachment "G"



I E S, INC.

Exposure risks for the Test Boring program are primarily through ingestion, dermal contact, and breathing of dust and vapors (inhalation). Hazardous material information sheets for each of the detected/suspected contaminants can be found in the **Attachment "G"** of this report.

F. ENVIRONMENTAL MONITORING

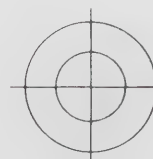
Workers will be notified of the presence of waste oil contaminated soil and groundwater, and proper precautions by the test boring contractor will be undertaken.

G. PERSONAL PROTECTIVE EQUIPMENT

The following is a brief description of levels of protection to be used by the site personnel in accordance with applicable OSHA regulations (29 CFR 1910.120):

Table 2
Summary of OSHA Protection Levels

Level D:	Work Clothes, Coveralls
	Safety Boots/Shoes
	Chemically Protective Outer Gloves
	Hard Hat
	Safety Glasses
Level C:	Half Mask Air Purifying Respirator
	Chemically Resistant Suit - Tyvek
	Outer Rubber Slush Boots
	Inner Gloves - Surgical Latex
	Hard Hat
	Safety Shoes - Chemically Protective
	Steel Toe and Shank
Level B:	Safety Glasses or Face Shield
	Self-Contained Breathing Apparatus
	Chemically Resistant Suit - Tyvek
	Outer Rubber Slush Boots
	Outer Chemically Resistant Gloves - Neoprene
	Inner Gloves - Cotton
	Hard Hat
	Safety Shoes/Glasses or Face Shield



I E S, INC.

The entry level of protection for all activities associated with the test borings and monitoring well installation will be Level D. The level of protection may be upgraded to Level C, if necessary.

H. EMERGENCY PROCEDURES

Communication of emergency signal in the work area will be with verbal commands. A telephone will also be made available for communication to or from the site in case of an emergency.

The following standard emergency procedures will be used by on-site personnel. The Site Safety Officer shall be notified of any on-site emergencies and be responsible for ensuring that the appropriate procedures are used:

Personal Injury in the Exclusion Zone:

Upon notification of an injury in the Exclusion Zone, a rescue team will enter the Exclusion Zone (if required) to remove the injured person to the "hotline". The Site Safety Officer and Project Team Leader should evaluate the nature of the injury prior to movement to the Support zone. The on-site Project Team Leader shall arrange for appropriate first aid, and contact should be made for an ambulance and with the designated medical facility (if required). No persons shall re-enter the Exclusion Zone until the case of the injury or symptoms is determined.

Personal Injury in the Support Zone:

Upon notification of an injury in the Support Zone, the Project Team Leader and Site Safety Officer will assess the nature of the injury. If the cause of the injury or loss of the injured person does not affect the performance of site personnel, operations may continue, with the on-site Project Team Leader initiating the appropriate first aid and necessary follow-up as stated above. If the injury increases the risk to others, all site personnel shall move to the "decontamination line" for further instructions. Activities on-site will cease until the risk is removed or minimized.

Fire or Explosion:

Upon notification of a fire or explosion, all site personnel will assemble at the "decontamination line". The Fire Department shall be alerted and all personnel immediately moved to a safe distance from the involved area. Due to the type of contamination present, the threat of fire or explosion is not considered likely.

Personal Protective Equipment Failures:

If any worker experiences a failure or alteration of protective equipment that affects the protection factor, that person and his/her "buddy" shall immediately leave the Exclusion Zone. Re-entry shall not be permitted until the equipment has been repaired or replaced.

Other Equipment Failures:

If any other equipment on-site fails to operate properly, the Project Team Leader and Site Safety Officer shall be notified and then determine the effect of this failure on continuing operations on-site. If the failure affects the safety of personnel or prevent completion of the Work Plan tasks, all personnel shall leave the Exclusion Zone until the situation is evaluated and appropriate actions taken.

In all situations, when an on-site emergency results in evacuation of the Exclusion Zone, personnel shall not re-enter until:

1. The conditions resulting in the emergency have been corrected;
2. The hazards have been re-assessed;
3. The Site Safety Plan has been reviewed and modified accordingly;
4. Site personnel have been briefed and have implemented any changes in the Site Safety Plan;
5. Personal Monitoring is implemented.

H. DECONTAMINATION PROCEDURES

If applicable, clean level D clothing will be utilized by site personnel each day, prior to initiation of work. Hard hats and boots shall be brushed clean to remove dust or soil particles at the end of the day. This shall be followed by a water rinse of boots, hard hats, etc. If utilized, respirators will be discarded following use. Decontamination shall be concluded with a washing hands and face. All field screening equipment and tools shall also be cleaned at the site after use.

I. EMERGENCY INFORMATION

Table 3
Emergency Telephone Numbers

Boston Police Department	911
Boston Fire Department (Emergency)	911
Ambulance Service	911
Nearest Hospital	(617) 983-7000
Project Safety Officer	(617) 623-8880
Scientific Advisor	(617) 623-8880
Additional Emergency Contacts:	
Chemtrec	(800) 424-9300
TSCA Hotline	(800) 424-9065
ATF (Explosives)	(800) 424-9555
National Response Center	(800) 424-8802
Pesticide Information Center	(800) 845-7633
RCRA Hotline	(800) 424-9346
CMA Chemical Referral Center	(800) 262-8200
National Poison Control Center	(800) 942-5969
US DOT	(202) 366-0656
Center For Disease Control	(404) 633-5313
DOT Hazardous Material Info	(202) 366-4488
Emergency Planning & Community Right-to-Know	(800) 535-0202
FEMA	(817) 898-9104
OSHA	(800) 582-1708

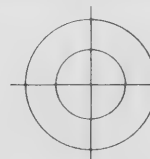
Primary Source of Medical Attention

Facility Name:	Faulkner Hospital
Address:	1153 Centre Street, Jamaica Plain, MA
Telephone #:	(617) 983-7000

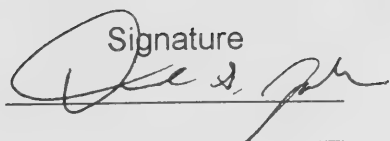
Directions to Faulkner Hospital: Exit site and head south on VFW Parkway (Route 1), bear right for U-turn, and reverse direction to head north on VFW Parkway. Follow VFW Parkway until it ends, and take a left at the light on to Center Street (still Route 1). Faulkner Hospital is immediately on the left.

H. SIGNATURE LIST

All site personnel have read this Health and Safety Plan and are familiar with its provisions:



I E S, INC.

	Name	Signature
Site Safety Officer	Daniel Jaffe	
Project Team Leader	Same	
Other Site Personnel	Kerry Asetta	

ATTACHMENT "D"

TEST BORING LOGS

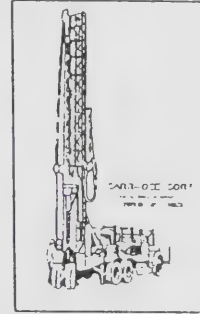
Since 1951



37 Linden Street • P.O. Box 67 • Medford, MA 02155-0001 • Telephone (617) 391-4500 • Fax (617) 395-3231

July 18, 1996

IES FILE NO. 496-197



IES, Inc.
265 Medford Street, STE 312
Somerville, MA 02143

Attention: Mr. Daniel G. Jaffe

Attached are the results of subsurface investigations, made as directed at site for 21E Study, 1575 VFW Parkway, West Roxbury, MA.

Classification of soil samples are from driller's field logs. Our policy is to examine and sometimes re-classify said samples. This we could not do, since samples were handed to your representative at the field site. Therefore, we suggest that soil classifications are subject to change.

At your convenience, please provide this office with a plan indicating test boring locations, to complete our file.

In making inquiries, please refer to our Job No. 96138.

Very truly yours,

CARR-DEE CORP.

A handwritten signature in cursive script, reading 'Henry J. DeSimone'.

Henry J. DeSimone
Principal

HJD/mh

CARR-DEE CORP.

ANDEN STREET P.O. BOX 67 MEDFORD, MA 02155-0001 Telephone (617) 391-4500
 S, INC., 265 MEDFORD STREET, SOMERVILLE, MA Date Jul. 18, 1996 Job No. 96138
 ion 1575 VFW PARKWAY, WEST ROXBURY, MA Scale 1" = 3'

BORING 1

Ground Surface

0'3"	A S P H A L T		
		AUGER SAMPLE	S#1, FROM 0'6" TO 2'6"
	F I L L		
	SAND, GRAVEL,		
	STONES	7	S#2, FROM 5'0" TO 7'0"
		4	RECOVERED 11"
		8	
7'0"		12	
	DENSE		
	MEDIUM SAND &		
	GRAVEL	12	S#3, FROM 10'0" TO 12'0"
		15	RECOVERED 15"
		14	
12'0"		13	

WATER LEVEL 5'0"

SIZE OF AUGERS 3-3/4" I.D., DEPTH 10'0"

DRILLER: JOSEPH DESIMONE, INSPECTOR: WILLIAM MOUREY

DATE STARTED & COMPLETED: 7-17-96

INSTALLED OBSERVATION WELL (2" PVC PIPE, 10'0" SLOTTED,
 NO SOLID), 10'0" BELOW GROUND SURFACE, INCLUDING ROADWAY
 BOX.

samples have been visually classified by Driller. Unless otherwise specified, water levels noted were observed at completion
 rings, and do not necessarily represent permanent ground water levels. Figures in right hand column indicate number of blows
 red to drive Two-Inch Split Sampler 6 inches using 140 lb. weight falling 30 inches(+/-). Figures in column to left
 (noted) indicate number of blows to drive casing one foot, using 300 lb. weight falling 24 inches(+/-).

CARR-DEE CORP.

NDEN STREET P.O. BOX 67 MEDFORD, MA 02155-0001 Telephone (617) 391-4500
 S, INC., 265 MEDFORD STREET, SOMERVILLE, MA Date Jul. 18, 1996 Job No. 96138
 ion 1575 VFW PARKWAY, WEST ROXBURY, MA Scale 1" = 3'

BORING 2

Ground Surface

0'3"	ASPHALT		
		AUGER SAMPLE	S#1, FROM 0'6" TO 2'6"
	FILL		
	SAND, GRAVEL		
		5	S#2, FROM 5'0" TO 7'0"
		6	RECOVERED 10"
		4	
	& STONES	8	
9'0"			

REFUSAL ENCOUNTERED WITH AUGER

WATER LEVEL 5'0"

SIZE OF AUGERS 3-3/4" I.D., DEPTH 9'0"

DRILLER: JOSEPH DESIMONE, INSPECTOR: WILLIAM MOUREY

DATE STARTED & COMPLETED: 7-17-96

INSTALLED OBSERVATION WELL (2" PVC PIPE, 10'0" SLOTTED,
 NO SOLID, 1'0" CUT-OFF), 9'0" BELOW GROUND SURFACE,
 INCLUDING ROADWAY BOX.

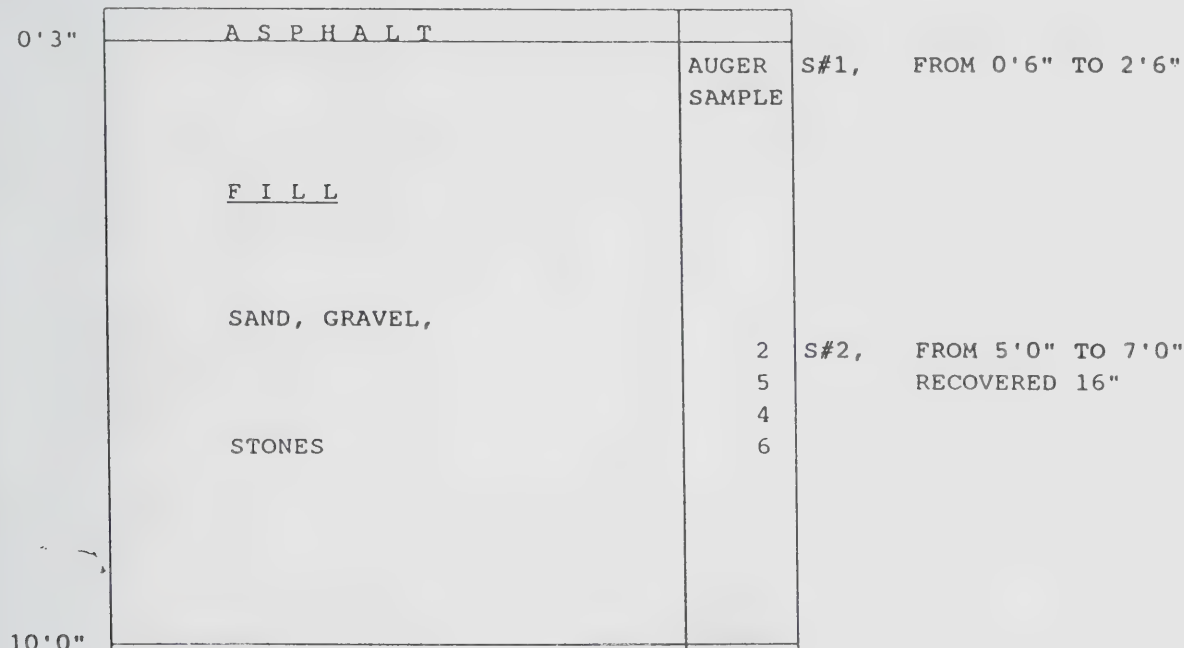
mples have been visually classified by Driller. Unless otherwise specified, water levels noted were observed at completion
 ings, and do not necessarily represent permanent ground water levels. Figures in right hand column indicate number of blows
 ed to drive Two-Inch Split Sampler 6 inches using 140 lb. weight falling 30 inches(+/-). Figures in column to left
 ted) indicate number of blows to drive casing one foot, using 300 lb. weight falling 24 inches(+/-).

CARR-DEE CORP.

NDEN STREET P.O. BOX 67 MEDFORD, MA 02155-0001 Telephone (617) 391-4500
 S, INC., 265 MEDFORD STREET, SOMERVILLE, MA Date Jul. 18, 1996 Job No. 96138
 ion 1575 VFW PARKWAY, WEST ROXBURY, MA Scale 1" = 3'

BORING 3

Ground Surface



WATER LEVEL 5'0"

SIZE OF AUGERS 3-3/4" I.D., DEPTH 10'0"

DRILLER: JOSEPH DESIMONE, INSPECTOR: WILLIAM MOUREY

DATE STARTED & COMPLETED: 7-17-96

INSTALLED OBSERVATION WELL (2" PVC PIPE, 10'0" SLOTTED,
 NO SOLID), 10'0" BELOW GROUND SURFACE, INCLUDING ROADWAY
 BOX.

amples have been visually classified by Driller. Unless otherwise specified, water levels noted were observed at completion
 rings, and do not necessarily represent permanent ground water levels. Figures in right hand column indicate number of blows
 red to drive Two-Inch Split Sampler 6 inches using 140 lb. weight falling 30 inches(+/-). Figures in column to left
 noted) indicate number of blows to drive casing one foot, using 300 lb. weight falling 24 inches(+/-).

CARR-DEE CORP.

DEN STREET P.O. BOX 67 MEDFORD, MA 02155-0001 Telephone (617) 391-4500
 , INC., 265 MEDFORD STREET, SOMERVILLE, MA Date Jul. 18, 1996 Job No. 96138
 on 1575 VFW PARKWAY, WEST ROXBURY, MA Scale 1" = 3'

BORING 4

Ground Surface

0'3"	ASPHALT		
	FILL		
	SAND, GRAVEL,		
	STONES	12	S#1, FROM 0'6" TO 2'6"
		10	
		9	
		8	
8'6"			
	MEDIUM DENSE		
	MEDIUM SAND &		
	GRAVEL	12	S#2, FROM 5'0" TO 7'0"
		10	RECOVERED 12"
		11	
12'0"		15	
			S#3, FROM 10'0" TO 12'0"
			RECOVERED 16"

WATER LEVEL 6'0"

SIZE OF AUGERS 3-3/4" I.D., DEPTH 10'0"

DRILLER: JOSEPH DESIMONE, INSPECTOR: WILLIAM MOUREY

DATE STARTED & COMPLETED: 7-17-96

INSTALLED OBSERVATION WELL (2" PVC PIPE, 10'0" SLOTTED,
 NO SOLID), 10'0" BELOW GROUND SURFACE, INCLUDING ROADWAY
 BOX.

bles have been visually classified by Driller. Unless otherwise specified, water levels noted were observed at completion
 gs, and do not necessarily represent permanent ground water levels. Figures in right hand column indicate number of blows
 d to drive Two-Inch Split Sampler 6 inches using 140 lb. weight falling 30 inches(+/-). Figures in column to left
 ed) indicate number of blows to drive casing one foot, using 300 lb. weight falling 24 inches(+/-).

CARR-DEE CORP.

INDEN STREET P.O. BOX 67 MEDFORD, MA 02155-0001 Telephone (617) 391-4500
 ES, INC., 265 MEDFORD STREET, SOMERVILLE, MA Date Jul. 18, 1996 Job No. 96138
 tion 1575 VFW PARKWAY, WEST ROXBURY, MA Scale 1" = 3'

BORING 5

Ground Surface

0'2"	A S P H A L T		
		AUGER SAMPLE	S#1, FROM 0'6" TO 2'6"
	F I L L		
	SAND, GRAVEL,		
		10	S#2, FROM 5'0" TO 7'0"
		13	RECOVERED 13"
		7	
	COBBLES	15	
		AUGER SAMPLE	S#3, FROM 8'0" TO 10'0"
10'0"			

WATER LEVEL 5'0"

SIZE OF AUGERS 3-3/4" I.D., DEPTH 10'0"

DRILLER: JOSEPH DESIMONE, INSPECTOR: WILLIAM MOUREY

DATE STARTED & COMPLETED: 7-17-96

INSTALLED OBSERVATION WELL (2" PVC PIPE, 10'0" SLOTTED, NO SOLID), 10'0" BELOW GROUND SURFACE, INCLUDING ROADWAY BOX.

samples have been visually classified by Driller. Unless otherwise specified, water levels noted were observed at completion rings, and do not necessarily represent permanent ground water levels. Figures in right hand column indicate number of blows red to drive Two-Inch Split Sampler 6 inches using 140 lb. weight falling 30 inches(+/-). Figures in column to left (noted) indicate number of blows to drive casing one foot, using 300 lb. weight falling 24 inches(+/-).

CARR-DEE CORP.

DEN STREET P.O. BOX 67 MEDFORD, MA 02155-0001 Telephone (617) 391-4500
 INC., 265 MEDFORD STREET, SOMERVILLE, MA Date Jul. 18, 1996 Job No. 96138
 on 1575 VFW PARKWAY, WEST ROXBURY, MA Scale 1" = 3'

BORING 6

Ground Surface

0'2"	A S P H A L T	AUGER S#1, FROM 0'6" TO 2'6"
		SAMPLE
	F I L L	
	SAND, GRAVEL	4 S#2, FROM 5'0" TO 7'0"
		6 RECOVERED 10"
		9
	& STONES	15
10'0"		

WATER LEVEL 4'0"

SIZE OF AUGERS 3-3/4" I.D., DEPTH 10'0"

DRILLER: JOSEPH DESIMONE, INSPECTOR: WILLIAM MOUREY

DATE STARTED & COMPLETED: 7-17-96

INSTALLED OBSERVATION WELL (2" PVC PIPE, 10'0" SLOTTED,
 NO SOLID), 10'0" BELOW GROUND SURFACE, INCLUDING ROADWAY
 BOX.

amples have been visually classified by Driller. Unless otherwise specified, water levels noted were observed at completion
 rings, and do not necessarily represent permanent ground water levels. Figures in right hand column indicate number of blows
 red to drive Two-Inch Split Sampler 6 inches using 140 lb. weight falling 30 inches(+/-). Figures in column to left
 oted) indicate number of blows to drive casing one foot, using 300 lb. weight falling 24 inches(+/-).

ATTACHMENT "E"

LABORATORY RESULTS

TMA

Thermo Analytical

QUALITY ENVIRONMENTAL SERVICES

Report for

IES, Inc.

WORK ORDER #S607130

Scientific Services Since 1922

Thermo Analytical

300 Second Avenue

P.O. Box 521

Waltham, MA 02254-0521

(617) 890-7200 Fax: (617) 890-3883

(800) 4-LABTEST

A subsidiary of Thermo Process Systems, Inc., a Thermo Electron company

Thermo Analytical
300 Second Avenue
P.O. Box 521
Waltham, MA 02254
Attn: Client Services
Phone: (617) 890-7200

IES, Inc.
265 Medford Street
Suite 312
Somerville MA 02143
Attn: Daniel Jaffe

Order #: S6-07-130
Date: 08/02/96 12:29
Work ID: VFW Parkway
Date Received: 07/18/96
Date Completed: 08/02/96

Purchase Order: 496-197
Invoice Number:

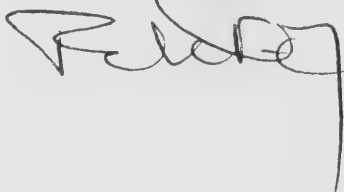
Client Code: IES

SAMPLE IDENTIFICATION

Sample Number	Sample Description	Sample Number	Sample Description
01	B-1/S-3	04	B-4/S-3
02	B-2/S-2	05	B-5/S-3
03	B-3/S-1	06	B-6/S-2

Key: U = Analyte not detected at specified limit
J = Analyte detected below quantitation limit
Solid samples are reported on a dry weight basis unless
otherwise indicated.

Certified By
Richard P. Purdy



MA

Thermo Analytical

300 Second Avenue P.O. Box 521 Waltham, Massachusetts 02254-0521 (617) 890-7200 1-800-411-AB-TEST Fax: (617) 890-3982

This report is rendered upon all of the following conditions: Thermo Analytical retains ownership of this report until associated submitted invoice is satisfied. Expert witness services shall be available in conjunction with this report only if prior notification of this potential requirement was made and accepted before the analysis. Client will be responsible for Thermo Analytical costs and consulting fees if our services are required by subpoena or otherwise in legal proceedings. Total liability is limited to the invoice amount. The results listed refer only to tested samples and applicable parameters. Samples are not analyzed in accordance with New York State protocol unless indicated. Product endorsement is neither inferred nor implied. Thermo Analytical will exercise due diligence but will not be responsible for lost or destroyed samples or evidence unless client makes appropriate insurance coverage arrangements. Samples are held for thirty days following issuance of report. Samples will be stored at client's expense, if authorized in writing.

Order # S6-07-130
08/02/96 12:29

Thermo Analytical
TEST RESULTS BY SAMPLE

Page 2

Sample: 01A B-1/S-3

Collected: 07/17/96 Category: SOIL

Test Description	Result	Limit	Units	Analyzed	By
Petroleum Hydrocarbons	1480	49.1	mg/kg	07/23/96	YLK

Sample: 03A B-3/S-1

Collected: 07/17/96 Category: SOIL

Test Description	Result	Limit	Units	Analyzed	By
Petroleum Hydrocarbons	3010	116	mg/kg	07/23/96	YLK

Sample: 04A B-4/S-3

Collected: 07/17/96 Category: SOIL

Test Description	Result	Limit	Units	Analyzed	By
Petroleum Hydrocarbons	642	11.9	mg/kg	07/23/96	YLK

Sample: 05A B-5/S-3

Collected: 07/17/96 Category: SOIL

Test Description	Result	Limit	Units	Analyzed	By
Petroleum Hydrocarbons	9670	268	mg/kg	07/23/96	YLK

Sample: 06A B-6/S-2

Collected: 07/17/96 Category: SOIL

Test Description	Result	Limit	Units	Analyzed	By
Petroleum Hydrocarbons	11800	346	mg/kg	07/23/96	YLK

Order # S6-07-130
08/02/96 12:29

Thermo Analytical
TEST RESULTS BY SAMPLE

Page 3

Sample Description: B-1/S-3 Lab No: 01B
Test Description: Purgeable Aromatics - Soil Method: SW846 8020 Test Code: 8020
Collected: 07/17/96 Category: SOIL

DATE INJECTED 07/24/96 DILUTION FACTOR 1.10
All results reported in ug/kg

CAS NO.	COMPOUND	RESULT	DET LIMIT
71-43-2	Benzene	U	1.1
108-88-3	Toluene	2.8	1.1
108-90-7	Chlorobenzene	U	1.1
100-41-4	Ethylbenzene	19	1.1
108-38-3	m+p-Xylenes	300	1.1
95-47-6	o-Xylene	150	1.1
541-73-1	1,3-Dichlorobenzene	U	1.1
106-46-7	1,4-Dichlorobenzene	2.4	1.1
95-50-1	1,2-Dichlorobenzene	2.9	1.1
1634-04-4	methyl-t-butyl ether	U	1.1

NOTES AND DEFINITIONS FOR THIS REPORT.

U = not detected at detection limit

MA

Thermo Analytical

Second Avenue, P.O. Box 521, Waltham, Massachusetts 02254-0521 (617) 890-7200 1-800-4LAB TEST Fax: (617) 890-3883

This report is rendered upon all of the following conditions: Thermo Analytical retains ownership of this report until associated submitted invoice is satisfied. Expert witness services shall be available in conjunction with this report only if prior notification of this potential requirement was made and accepted before the analysis. Client will be responsible for Thermo Analytical costs and consulting fees if our services are required by subpoena or otherwise in legal proceedings. Total liability is limited to the invoice amount. The results listed refer only to tested samples and applicable parameters. Samples are not analyzed in accordance with New York State protocol unless indicated. Product endorsement is neither inferred nor implied. Thermo Analytical will exercise due diligence but will not be responsible for lost or destroyed samples or evidence unless client makes appropriate insurance coverage arrangements. Samples are held for thirty days following issuance of report. Samples will be stored at client's expense, if authorized in writing.

Order # S6-07-130
08/02/96 12:29

Thermo Analytical
TEST RESULTS BY SAMPLE

Page 4

Sample Description: B-2/S-2 Lab No: 02A
Test Description: Tot. Pet. Hydrocarbons/GC Method: SW-846 8100M Test Code: 8100MS
Collected: 07/17/96 Category: SOIL

PETROLEUM HYDROCARBON CHARACTERIZATION

PARAMETER	RESULT	LIMIT
Gasoline	U	1100
Diesel Fuel	U	1100
Fuel Oil #4	U	2200
Fuel Oil #6	22100	2200
Mineral Spirits	U	1100
Kerosene	U	2200
Motor Oil	U	1100

SURROGATE	%RECOVERY	LIMITS
o-terphenyl	161 Q	50 - 150

Notes and Definitions for this Report:
U = undetected at specified limit
Q = recovery did not meet QC requirements

Date Extracted	08/01/96	Date Analyzed	08/02/96
Units	mg/kg	Factor	107.5

COMMENTS

Unknown TPH. Sample quantitated against the Fuel Oil #6 Std which was the best match covering the carbon range C10-C28. Heavy matrix interference was present in the sample.

This report is rendered upon all of the following conditions: Thermo Analytical retains ownership of this report until associated submitted invoice is satisfied. Expert witness services shall be available in conjunction with this report only if prior notification of this potential requirement was made and accepted before the analysis. Client will be responsible for Thermo Analytical costs and consulting fees if our services are required by subpoena or otherwise in legal proceedings. Total liability is limited to the invoice amount. The results listed refer only to tested samples and applicable parameters. Samples are not analyzed in accordance with New York State protocol unless indicated. Product endorsement is neither inferred nor implied. Thermo Analytical will exercise due diligence but will not be responsible for lost or destroyed samples or evidence unless client makes appropriate insurance coverage arrangements. Samples are held for thirty days following issuance of report. Samples will be stored at client's expense, if authorized in writing.

Order # S6-07-130
08/02/96 12:29

Thermo Analytical
TEST RESULTS BY SAMPLE

Page 5

Sample Description: B-2/S-2

Lab No: 02B

Test Description: Volatile Analysis 8260

Method: SW846 8260 Test Code: 8260_S

Collected: 07/17/96

Category: SOIL

Date Analyzed 07/31/96 Dilution Factor 6.0
All results reported in ug/kg

COMPOUND	RESULT	LIMIT	COMPOUND	RESULT	LIMIT
acetone	320	30	1,2-dichloropropane	U	30
acrolein	U	30	1,3-dichloropropane	U	30
acrylonitrile	U	30	2,2-dichloropropane	U	30
benzene	190	30	1,1-dichloropropene	U	30
bromobenzene	U	30	cis,trans-1,3-dichloropropene	U	30
bromochloromethane	U	30	ethylbenzene	8000	138
bromodichloromethane	U	30	ethyl methacrylate	510	30
bromoform	U	30	hexachlorobutadiene	U	30
bromomethane	U	30	2-hexanone	U	30
2-butanone	U	30	iodomethane	U	30
n-butylbenzene	U	30	isopropylbenzene	270	30
sec-butylbenzene	86	30	p-isopropyltoluene	180	30
tert-butylbenzene	U	30	4-methyl-2-pentanone	U	30
carbon disulfide	U	30	methyl-t-butyl ether	U	30
carbon tetrachloride	U	30	methylene chloride	62	30
chlorobenzene	U	30	naphthalene	850	30
chloroethane	U	30	n-propylbenzene	830	30
2-chloroethylvinyl ether	U	30	styrene	U	30
chloroform	29	30	1,1,1,2-tetrachloroethane	U	30
chloromethane	U	30	1,1,2,2-tetrachloroethane	U	30
2-chlorotoluene	U	30	tetrachlorethene	12	30
4-chlorotoluene	U	30	toluene	6700	138
dibromochloromethane	U	30	1,2,3-trichlorobenzene	U	30
1,2-dibromo-3-chloropropane	U	30	1,2,4-trichlorobenzene	U	30
1,2-dibromoethane	U	30	1,1,1-trichloroethane	37	30
dibromomethane	U	30	1,1,2-trichloroethane	U	30
1,2-dichlorobenzene	U	30	trichloroethene	22	30
1,3-dichlorobenzene	U	30	trichlorofluoromethane	U	30
1,4-dichlorobenzene	U	30	1,2,3-trichloropropane	U	30
1,4-dichloro-2-butene	U	30	1,2,4-trimethylbenzene	2100	30
dichlorodifluoromethane	U	30	1,3,5-trimethylbenzene	1300	30
1,1-dichloroethane	U	30	vinyl acetate	U	30
1,2-dichloroethane	U	30	vinyl chloride	U	30
1,1-dichloroethene	U	30	o-xylene	15000	138
cis-1,2-dichloroethene	U	30	m-,p-xylene	33000	138
trans-1,2-dichloroethene	U	30			

NOTES AND DEFINITIONS FOR THIS REPORT

U = not detected at stated detection limit
J = detected below quantitation limit
B = compound detected in the method blank
Q = recovery exceeds control limit

SURROGATE STDS.	%REC	LIMITS
dibromofluoromethane	117	45 - 149
toluene-d8	108	55 - 126
4-bromofluorobenzene	98	41 - 149

MA

Thermo Analytical

Second Avenue, P.O. Box 521, Waltham, Massachusetts 02254-0521

(617) 890-7200

1-800-4LAB TEST

Fax: (617) 890-3883

This report is rendered upon all of the following conditions: Thermo Analytical retains ownership of this report until associated submitted invoice is satisfied. Expert witness services shall be available in conjunction with this report only if prior notification of this potential requirement was made and accepted before the analysis. Client will be responsible for Thermo Analytical costs and consulting fees if our services are required by subpoena or otherwise in legal proceedings. Total liability is limited to the invoice amount. The results listed refer only to tested samples and applicable parameters. Samples are not analyzed in accordance with New York State protocol unless indicated. Product endorsement is neither inferred nor implied. Thermo Analytical will exercise due diligence but will not be responsible for lost or destroyed samples or evidence unless client makes appropriate insurance coverage arrangements. Samples are held for thirty days following issuance of report. Samples will be stored at client's expense, if authorized in writing.

Order # S6-07-130
08/02/96 12:29

Thermo Analytical
TEST RESULTS BY SAMPLE

Page 6

Sample Description: B-3/S-1 Lab No: 03B
Test Description: Purgeable Aromatics - Soil Method: SW846 8020 Test Code: 8020
Collected: 07/17/96 Category: SOIL

DATE INJECTED 07/24/96 DILUTION FACTOR 1.20
All results reported in ug/kg

CAS NO.	COMPOUND	RESULT	DET LIMIT
71-43-2	Benzene	48	1.2
108-88-3	Toluene	780	6
108-90-7	Chlorobenzene	U	1.2
100-41-4	Ethylbenzene	240	1.2
108-38-3	m+p-Xylenes	1300	6
95-47-6	o-Xylene	620	6
541-73-1	1,3-Dichlorobenzene	U	1.2
106-46-7	1,4-Dichlorobenzene	U	1.2
95-50-1	1,2-Dichlorobenzene	U	1.2
1634-04-4	methyl-t-butyl ether	U	1.2

NOTES AND DEFINITIONS FOR THIS REPORT.

U = not detected at detection limit

This report is rendered upon all of the following conditions: Thermo Analytical retains ownership of this report until associated submitted invoice is satisfied. Expert witness services shall be available in conjunction with this report only if prior notification of this potential requirement was made and accepted before the analysis. Client will be responsible for Thermo Analytical costs and consulting fees if our services are required by subpoena or otherwise in legal proceedings. Total liability is limited to the invoice amount. The results listed refer only to tested samples and applicable parameters. Samples are not analyzed in accordance with New York State protocol unless indicated. Product endorsement is neither inferred nor implied. Thermo Analytical will exercise due diligence but will not be responsible for lost or destroyed samples or evidence unless client makes appropriate insurance coverage arrangements. Samples are held for thirty days following issuance of report. Samples will be stored at client's expense, if authorized in writing.

MA
Thermo Analytical

Second Avenue, P.O. Box 521, Waltham, Massachusetts 02254-0521 (617) 890-7200 1-800-4LAB TEST Fax: (617) 890-3883

Order # S6-07-130
08/02/96 12:29

Thermo Analytical
TEST RESULTS BY SAMPLE

Page 7

Sample Description: B-4/S-3 Lab No: 048
Test Description: Purgeable Aromatics - Soil Method: SW846 8020 Test Code: 8020
Collected: 07/17/96 Category: SOIL

DATE INJECTED 07/24/96 DILUTION FACTOR 1.30
All results reported in ug/kg

CAS NO.	COMPOUND	RESULT	DET LIMIT
71-43-2	Benzene	U	1.3
108-88-3	Toluene	4.5	1.3
108-90-7	Chlorobenzene	U	1.3
100-41-4	Ethylbenzene	53	1.3
108-38-3	m+p-Xylenes	210	1.3
95-47-6	o-Xylene	63	1.3
541-73-1	1,3-Dichlorobenzene	U	1.3
106-46-7	1,4-Dichlorobenzene	U	1.3
95-50-1	1,2-Dichlorobenzene	1.8	1.3
1634-04-4	methyl-t-butyl ether	U	1.3

NOTES AND DEFINITIONS FOR THIS REPORT.

U = not detected at detection limit

This report is rendered upon all of the following conditions: Thermo Analytical retains ownership of this report until associated submitted invoice is satisfied. Expert witness services shall be available in conjunction with this report only if prior notification of this potential requirement was made and accepted before the analysis. Client will be responsible for Thermo Analytical costs and consulting fees if our services are required by subpoena or otherwise in legal proceedings. Total liability is limited to the invoice amount. The results listed refer only to tested samples and applicable parameters. Samples are not analyzed in accordance with New York State protocol unless indicated. Product endorsement is neither inferred nor implied. Thermo Analytical will exercise due diligence but will not be responsible for lost or destroyed samples or evidence unless client makes appropriate insurance coverage arrangements. Samples are held for thirty days following issuance of report. Samples will be stored at client's expense, if authorized in writing.

Order # S6-07-130
08/02/96 12:29

Thermo Analytical
TEST RESULTS BY SAMPLE

Page 8

Sample Description: B-5/S-3 Lab No: 058
Test Description: Purgeable Aromatics - Soil Method: SW846 8020 Test Code: 8020
Collected: 07/17/96 Category: SOIL

DATE INJECTED 07/24/96 DILUTION FACTOR 1.20
All results reported in ug/kg

CAS NO.	COMPOUND	RESULT	DET LIMIT
71-43-2	Benzene	25	1.2
108-88-3	Toluene	31	1.2
108-90-7	Chlorobenzene	U	1.2
100-41-4	Ethylbenzene	240	6
108-38-3	m+p-Xylenes	1800	6
95-47-6	o-Xylene	370	6
541-73-1	1,3-Dichlorobenzene	U	1.2
106-46-7	1,4-Dichlorobenzene	9.6	1.2
95-50-1	1,2-Dichlorobenzene	U	1.2
1634-04-4	methyl-t-butyl ether	U	1.2

NOTES AND DEFINITIONS FOR THIS REPORT.
U = not detected at detection limit

This report is rendered upon all of the following conditions: Thermo Analytical retains ownership of this report until associated submitted invoice is satisfied. Expert witness services shall be available in conjunction with this report only if prior notification of this potential requirement was made and accepted before the analysis. Client will be responsible for Thermo Analytical costs and consulting fees if our services are required by subpoena or otherwise in legal proceedings. Total liability is limited to the invoice amount. The results listed refer only to tested samples and applicable parameters. Samples are not analyzed in accordance with New York State protocol unless indicated. Product endorsement is neither inferred nor implied. Thermo Analytical will exercise due diligence but will not be responsible for lost or destroyed samples or evidence unless client makes appropriate insurance coverage arrangements. Samples are held for thirty days following issuance of report. Samples will be stored at client's expense, if authorized in writing.

MA
thermo Analytical

Second Avenue, P.O. Box 521, Waltham, Massachusetts 02254-0521 (617) 890-7200 1-800-4LAB TEST Fax: (617) 890-3883

Order # S6-07-130
08/02/96 12:29

Thermo Analytical
TEST RESULTS BY SAMPLE

Page 9

Sample Description: B-6/S-2 Lab No: 06B
Test Description: Purgeable Aromatics - Soil Method: SW846 8020 Test Code: 8020
Collected: 07/17/96 Category: SOIL

DATE INJECTED 07/24/96 DILUTION FACTOR 1.20
All results reported in ug/kg

CAS NO.	COMPOUND	RESULT	DET LIMIT
71-43-2	Benzene	37	1.2
108-88-3	Toluene	9.4	1.2
108-90-7	Chlorobenzene	U	1.2
100-41-4	Ethylbenzene	7.0	1.2
108-38-3	m+p-Xylenes	120	1.2
95-47-6	o-Xylene	32	1.2
541-73-1	1,3-Dichlorobenzene	U	1.2
106-46-7	1,4-Dichlorobenzene	2.3	1.2
95-50-1	1,2-Dichlorobenzene	U	1.2
1634-04-4	methyl-t-butyl ether	U	1.2

NOTES AND DEFINITIONS FOR THIS REPORT.
U = not detected at detection limit

SW-846 Method 8100-Modified - Polynuclear Aromatic Hydrocarbons (Modified for the determination and characterization of Total Petroleum Hydrocarbons in soil samples) Comparisons were made to the reference materials based on peak pattern and retention time windows.

SW846 Method 8020 - Aromatic Volatile Organics by Gas Chromatography/Mass Spectrometry (modified to include methyl-t-butyl ether) The solid samples were prepared by SW846 Method 5030.

USEPA Test Methods for Evaluating Solid Wastes (SW846, Third Edition)
Method 8260 - Volatile Organics by purge and trap and Gas Chromatography/
Mass Spectroscopy.

Petroleum Hydrocarbons in Soil, Total Recoverable
EPA-600 Methods for Chemical Analysis of Water and Wastes
Method 418.1 (Spectrophotometric, Infrared)

This report is rendered upon all of the following conditions: Thermo Analytical retains ownership of this report until associated submitted invoice is satisfied. Expert witness services shall be available in conjunction with this report only if prior notification of this potential requirement was made and accepted before the analysis. Client will be responsible for Thermo Analytical costs and consulting fees if our services are required by subpoena or otherwise in legal proceedings. Total liability is limited to the invoice amount. The results listed refer only to tested samples and applicable parameters. Samples are not analyzed in accordance with New York State protocol unless indicated. Product endorsement is neither inferred nor implied. Thermo Analytical will exercise due diligence but will not be responsible for lost or destroyed samples or evidence unless client makes appropriate insurance coverage arrangements. Samples are held for thirty days following issuance of report. Samples will be stored at client's expense, if authorized in writing.

PROJECT DISCUSSION

VOLATILES

Due to their nature, the samples indicated for EPA8020 analysis were analyzed by GC/MS Method 8260.

Sample B-3/S-1 was analyzed undilute and at a 5X dilution to bring the target analytes within the calibration range.

Sample B-5/S-3 was analyzed undilute and at a 5X dilution to bring the target analytes within the calibration range.

Sample B-2/S-2 was analyzed at a 5X and 125X dilution to bring the target analytes within the calibration range.

TPH (8100M)

Due to the nature of sample B-2/S-2, the extract was concentrated to a 5 ml final volume rather than the usual 1 ml final volume. The sample was analyzed at a further 20X dilution.



CHAIN OF CUSTODY RECORD

Laboratory: Thermo Analytical

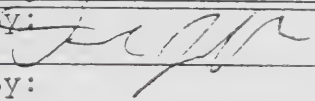
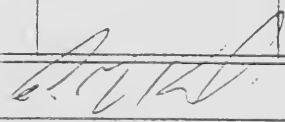
Project Name: VFW Parkway - W. Roxbury

Project Number: 496-197

Collector: William Mourey
(Signature)

IES Staff: Daniel Jaffe

Sample Identification	Date	Time	Sample Type		Number of Containers	Analysis Requested
			Water	Soil		
-1/S-3	7/17			X	1 jar	TPH - IR EPA 8020
-2/S-2	7/17			X	1 jar	TPH - GC/FID EPA 8240
-3/S-1	7/17			X	1 jar	TPH - IR EPA 8020
-4/S-3	7/17			X	1 jar	TPH - IR EPA 8020
B-5/S-3	7/17			X	1 jar	EPA 8020 TPH - IR
B-6/S-2	7/17			X	1 jar	EPA 8020 TPH - IR

Relinquished By: 	Received By: 	Date/ Time
(Signature)	(Signature)	7/18/16 10:50
Relinquished By:	Received By:	Date/ Time
(Signature)	(Signature)	
Relinquished By:	Received By:	Date/ Time
(Signature)	(Signature)	
Relinquished By:	Received By:	Date/ Time
(Signature)	(Signature)	

Comments: Please see serials 496-197-0000



300 Second Avenue

Post Office Box 521

Waltham, MA 02254-0521

(617) 890-7200 Fax: 890-3883

Report for

IES, Inc.

WORK ORDER #S607153

Thermo Analytical
300 Second Avenue
P.O. Box 521
Waltham, MA 02254
Attn: Client Services
Phone: (617) 890-7200

IES, Inc.
265 Medford Street
Suite 312
Somerville MA 02143
Attn: Daniel Jaffe

Order #: S6-07-153
Date: 08/02/96 18:03
Work ID: VFW Parkway
Date Received: 07/22/96
Date Completed: 08/02/96

Purchase Order: 496-197
Invoice Number:

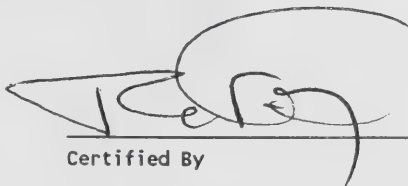
Client Code: IES

SAMPLE IDENTIFICATION

<u>Sample Number</u>	<u>Sample Description</u>
01	B-1
02	B-2
03	B-3
04	B-4

<u>Sample Number</u>	<u>Sample Description</u>
05	B-5
06	B-6
07	BLANK

Key: U = Analyte not detected at specified limit
J = Analyte detected below quantitation limit
Solid samples are reported on a dry weight basis unless
otherwise indicated.


Certified By

Order # S6-07-153
08/02/96 16:12

Thermo Analytical
TEST RESULTS BY SAMPLE

Page 2

Sample: 01C B-1

Collected: 07/20/96 Category: WATER

Test Description	Result	Limit	Units	Analyzed	By
Petroleum Hydrocarbons-H2O	17500	500	mg/L	08/01/96	YLK

Sample: 03C B-3

Collected: 07/20/96 Category: WATER

Test Description	Result	Limit	Units	Analyzed	By
Petroleum Hydrocarbons-H2O	24.6	0.50	mg/L	07/31/96	YLK

Sample: 04C B-4

Collected: 07/20/96 Category: WATER

Test Description	Result	Limit	Units	Analyzed	By
Petroleum Hydrocarbons-H2O	352	12.5	mg/L	07/31/96	YLK

Sample: 05C B-5

Collected: 07/20/96 Category: WATER

Test Description	Result	Limit	Units	Analyzed	By
Petroleum Hydrocarbons-H2O	31.6	1.0	mg/L	07/31/96	YLK

Sample: 06C B-6

Collected: 07/20/96 Category: WATER

Test Description	Result	Limit	Units	Analyzed	By
Petroleum Hydrocarbons-H2O	27.5	1.0	mg/L	07/31/96	YLK

Sample: 07C BLANK

Collected: 07/20/96 Category: WATER

Test Description	Result	Limit	Units	Analyzed	By
Petroleum Hydrocarbons-H2O	U	0.50	mg/L	07/31/96	YLK

This report is rendered upon all of the following conditions: Thermo Analytical retains ownership of this report until associated submitted invoice is satisfied. Expert witness services shall be available in conjunction with this report only if prior notification of this potential requirement was made and accepted before the analysis. Client will be responsible for Thermo Analytical costs and consulting fees if our services are required by subpoena or otherwise in legal proceedings. Total liability is limited to the invoice amount. The results listed refer only to tested samples and applicable parameters. Samples are not analyzed in accordance with New York State protocol unless indicated. Product endorsement is neither inferred nor implied. Thermo Analytical will exercise due diligence but will not be responsible for lost or destroyed samples or evidence unless client makes appropriate insurance coverage arrangements. Samples are held for thirty days following issuance of report. Samples will be stored at client's expense, if authorized in writing.

Order # S6-07-153
08/02/96 16:12

Thermo Analytical
TEST RESULTS BY SAMPLE

Page 3

Sample Description: B-1 Lab No: 01A
Test Description: Purgeable Aromatics -Water Method: SW846 8020 Test Code: 8020_W
Collected: 07/20/96 Category: WATER

DATE INJECTED 08/02/96 DILUTION FACTOR 5000
All results reported in micrograms/Liter

CAS NO.	COMPOUND	RESULT	DET LIMIT
71-43-2	Benzene	U	5000
108-88-3	Toluene	18000	5000
108-90-7	Chlorobenzene	U	5000
100-41-4	Ethylbenzene	49000	5000
108-38-3	m+p-Xylenes	240000	5000
95-47-6	o-Xylene	85000	5000
541-73-1	1,3-Dichlorobenzene	U	5000
106-46-7	1,4-Dichlorobenzene	U	5000
95-50-1	1,2-Dichlorobenzene	U	5000
1634-04-4	methyl-t-butyl ether	U	5000

SURROGATES

Toluene-d8 96% recovery

NOTES AND DEFINITIONS FOR THIS REPORT.
U = not detected at detection limit

This report is rendered upon all of the following conditions: Thermo Analytical retains ownership of this report until associated submitted invoice is satisfied. Expert witness services shall be available in conjunction with this report only if prior notification of this potential requirement was made and accepted before the analysis. Client will be responsible for Thermo Analytical costs and consulting fees if our services are required by subpoena or otherwise in legal proceedings. Total liability is limited to the invoice amount. The results listed refer only to tested samples and applicable parameters. Samples are not analyzed in accordance with New York State protocol unless indicated. Product endorsement is neither inferred nor implied. Thermo Analytical will exercise due diligence but will not be responsible for lost or destroyed samples or evidence unless client makes appropriate insurance coverage arrangements. Samples are held for thirty days following issuance of report. Samples will be stored at client's expense, if authorized in writing.

Order # S6-07-153
08/02/96 17:55

Thermo Analytical
TEST RESULTS BY SAMPLE

Page 4

Sample Description: B-2
Test Description: Water/VOA
Collected: 07/20/96

Lab No: 02A
Method: SW846 8240 Test Code: 8240_W
Category: WATER

DATE INJECTED 08/02/96 DILUTION FACTOR 5000.00
All results reported in UG/L

COMPOUND	RESULT	DET LIMIT	COMPOUND	RESULT	DET LIMIT
Chloromethane	U	50000	Bromodichloromethane	U	25000
Vinyl Chloride	U	50000	2-Chloroethyl Vinyl Ether	U	25000
Bromomethane	U	50000	4-Methyl-2-pentanone	U	50000
Chloroethane	U	50000	cis-1,3-Dichloropropene	U	25000
Trichlorofluoromethane	U	25000	Toluene	840000	25000
Acetone	U	50000	trans-1,3-Dichloropropene	U	25000
1,1-Dichloroethene	U	25000	1,1,2-Trichloroethane	U	25000
Carbon Disulfide	U	25000	2-Hexanone	U	50000
Methylene Chloride	120000	25000	Tetrachloroethene	U	25000
1,2-Dichloroethene (total)	U	25000	Dibromochloromethane	U	25000
1,1-Dichloroethane	U	25000	Chlorobenzene	U	25000
Vinyl Acetate	U	50000	Ethylbenzene	400000	25000
2-Butanone	U	50000	m and p-Xylene	1348000	25000
Chloroform	U	25000	o-Xylene	560000	25000
1,1,1-Trichloroethane	U	25000	Styrene	U	25000
Carbon Tetrachloride	U	25000	Bromoform	U	25000
Benzene	180000	25000	1,1,2,2-Tetrachloroethane	U	25000
1,2-Dichloroethane	U	25000	1,3-Dichlorobenzene	U	25000
Trichloroethene	U	25000	1,4-Dichlorobenzene	U	25000
1,2-Dichloropropane	U	25000	1,2-Dichlorobenzene	U	25000

SURROGATE STANDARDS

	% RECOVERY	LIMITS
1,2-Dichloroethane-D4	112	76 - 130
Toluene-D8	96	79 - 120
1-Bromo-4-fluorobenzene	94	68 - 131

NOTES AND DEFINITIONS FOR THIS REPORT

U = not detected at stated detection limit
J = compound detected below reporting limit
n/a = analysis not requested

This report is rendered upon all of the following conditions: Thermo Analytical retains ownership of this report until associated submitted invoice is satisfied. Expert witness services shall be available in conjunction with this report only if prior notification of this potential requirement was made and accepted before the analysis. Client will be responsible for Thermo Analytical costs and consulting fees if our services are required by subpoena or otherwise in legal proceedings. Total liability is limited to the invoice amount. The results listed refer only to tested samples and applicable parameters. Samples are not analyzed in accordance with New York State protocol unless indicated. Product endorsement is neither inferred nor implied. Thermo Analytical will exercise due diligence but will not be responsible for lost or destroyed samples or evidence unless client makes appropriate insurance coverage arrangements. Samples are held for thirty days following issuance of report. Samples will be stored at client's expense, if authorized in writing.

Order # S6-07-153
08/02/96 16:12

Thermo Analytical
TEST RESULTS BY SAMPLE

Page 5

Sample Description: B-2 Lab No: 02C
Test Description: Tot. Pet. Hydrocarbons/GC Method: SW-846 8100M Test Code: 8100MS
Collected: 07/20/96 Category: WATER

PETROLUEM HYDROCARBON CHARACTERIZATION

PARAMETER	RESULT	LIMIT
Gasoline	41000	25000
Diesel Fuel	U	25000
Fuel Oil #4	U	50000
Fuel Oil #6	U	50000
Mineral Spirits	U	25000
Kerosene	U	50000
Motor Oil	82000	25000

SURROGATE	%RECOVERY	LIMITS
o-terphenyl	80	50 - 150

Notes and Definitions for this Report:

U = undetected at specified limit

Q = recovery did not meet QC requirements

Date Extracted	07/26/96	Date Analyzed	07/31/96
Units	mg/kg	Factor	2490

COMMENTS

Sample quantitated against the gasoline standard.
Sample appears to be a gasoline/motor oil mixture
which covers the C10-C28.

Order # S6-07-153
08/02/96 16:12

Thermo Analytical
TEST RESULTS BY SAMPLE

Page 6

Sample Description: B-3

Lab No: 03A

Test Description: Purgeable Aromatics -Water

Method: SW846 8020

Test Code: 8020_W

Collected: 07/20/96

Category: WATER

DATE INJECTED 08/02/96 DILUTION FACTOR 10.00
All results reported in ug/L

CAS NO.	COMPOUND	RESULT	DET LIMIT
71-43-2	Benzene	21	10
108-88-3	Toluene	68	10
108-90-7	Chlorobenzene	U	10
100-41-4	Ethylbenzene	34	10
108-38-3	m+p-Xylenes	170	20
95-47-6	o-Xylene	56	10
541-73-1	1,3-Dichlorobenzene	U	10
106-46-7	1,4-Dichlorobenzene	U	10
95-50-1	1,2-Dichlorobenzene	U	10
1634-04-4	methyl-t-butyl ether	U	10

SURROGATES

Toluene-d8 84% recovery

NOTES AND DEFINITIONS FOR THIS REPORT.

U = not detected at detection limit



mo Analytical

ond Avenue, P.O. Box 521, Waltham, Massachusetts 02254-0521

(617) 890-7200

1-800-4LAB TEST

Fax: (617) 890-3883

This report is rendered upon all of the following conditions: Thermo Analytical retains ownership of this report until associated submitted invoice is satisfied. Expert witness services shall be available in conjunction with this report only if prior notification of this potential requirement was made and accepted before the analysis. Client will be responsible for Thermo Analytical costs and consulting fees if our services are required by subpoena or otherwise in legal proceedings. Total liability is limited to the invoice amount. The results listed refer only to tested samples and applicable parameters. Samples are not analyzed in accordance with New York State protocol unless indicated. Product endorsement is neither inferred nor implied. Thermo Analytical will exercise due diligence but will not be responsible for lost or destroyed samples or evidence unless client makes appropriate insurance coverage arrangements. Samples are held for thirty days following issuance of report. Samples will be stored at client's expense, if authorized in writing.

Order # S6-07-153
08/02/96 16:12

Thermo Analytical
TEST RESULTS BY SAMPLE

Page 7

Sample Description: B-4 Lab No: 04A
Test Description: Purgeable Aromatics -Water Method: SW846 8020 Test Code: 8020_W
Collected: 07/20/96 Category: WATER

DATE INJECTED 08/02/96 DILUTION FACTOR 10.00
All results reported in ug/L

CAS NO.	COMPOUND	RESULT	DET LIMIT
71-43-2	Benzene	170	10
108-88-3	Toluene	41	10
108-90-7	Chlorobenzene	U	10
100-41-4	Ethylbenzene	140	10
108-38-3	m+p-Xylenes	480	20
95-47-6	o-Xylene	140	10
541-73-1	1,3-Dichlorobenzene	U	10
106-46-7	1,4-Dichlorobenzene	U	10
95-50-1	1,2-Dichlorobenzene	U	10
1634-04-4	methyl-t-butyl ether	U	10

SURROGATES

Toluene-d8 90% recovery

NOTES AND DEFINITIONS FOR THIS REPORT.

U = not detected at detection limit

Order # S6-07-153
08/02/96 16:12

Thermo Analytical
TEST RESULTS BY SAMPLE

Page 8

Sample Description: B-5 Lab No: 05A
Test Description: Purgeable Aromatics -Water Method: SW846 8020 Test Code: 8020_W
Collected: 07/20/96 Category: WATER

DATE INJECTED 08/02/96 DILUTION FACTOR 1.00
All results reported in ug/L

CAS NO.	COMPOUND	RESULT	DET LIMIT
71-43-2	Benzene	70	1.0
108-88-3	Toluene	22	1.0
108-90-7	Chlorobenzene	U	1.0
100-41-4	Ethylbenzene	52	1.0
108-38-3	m+p-Xylenes	290	2.0
95-47-6	o-Xylene	60	1.0
541-73-1	1,3-Dichlorobenzene	U	1.0
106-46-7	1,4-Dichlorobenzene	U	1.0
95-50-1	1,2-Dichlorobenzene	U	1.0
1634-04-4	methyl-t-butyl ether	U	1.0

SURROGATES

Toluene-d8 94% recovery

NOTES AND DEFINITIONS FOR THIS REPORT.

U = not detected at detection limit

Order # S6-07-153
08/02/96 16:12

Thermo Analytical
TEST RESULTS BY SAMPLE

Page 9

Sample Description: B-6

Lab No: 06A

Test Description: Purgeable Aromatics -Water Method: SW846 8020 Test Code: 8020_W

Collected: 07/20/96

Category: WATER

DATE INJECTED 08/02/96 DILUTION FACTOR 1.00
All results reported in ug/L

CAS NO.	COMPOUND	RESULT	DET LIMIT
71-43-2	Benzene	28	1.0
108-88-3	Toluene	2.1	1.0
108-90-7	Chlorobenzene	U	1.0
100-41-4	Ethylbenzene	U	1.0
108-38-3	m+p-Xylenes	19	2.0
95-47-6	o-Xylene	U	1.0
541-73-1	1,3-Dichlorobenzene	U	1.0
106-46-7	1,4-Dichlorobenzene	U	1.0
95-50-1	1,2-Dichlorobenzene	U	1.0
1634-04-4	methyl-t-butyl ether	U	1.0

SURROGATES

Toluene-d8 98% recovery

NOTES AND DEFINITIONS FOR THIS REPORT.

U = not detected at detection limit

This report is rendered upon all of the following conditions: Thermo Analytical retains ownership of this report until associated submitted invoice is satisfied. Expert witness services shall be available in conjunction with this report only if prior notification of this potential requirement was made and accepted before the analysis. Client will be responsible for Thermo Analytical costs and consulting fees if our services are required by subpoena or otherwise in legal proceedings. Total liability is limited to the invoice amount. The results listed refer only to tested samples and applicable parameters. Samples are not analyzed in accordance with New York State protocol unless indicated. Product endorsement is neither inferred nor implied. Thermo Analytical will exercise due diligence but will not be responsible for lost or destroyed samples or evidence unless client makes appropriate insurance coverage arrangements. Samples are held for thirty days following issuance of report. Samples will be stored at client's expense, if authorized in writing.



Thermo Analytical

Second Avenue, P.O. Box 521, Waltham, Massachusetts 02254-0521 (617) 890-7200 1-800-4LAB TEST Fax: (617) 890-3883

Order # S6-07-153
08/02/96 16:12

Thermo Analytical
TEST RESULTS BY SAMPLE

Page 10

Sample Description: BLANK

Lab No: 07A

Test Description: Purgeable Aromatics -Water Method: SW846 8020 Test Code: 8020_W

Collected: 07/20/96

Category: WATER

DATE INJECTED 08/01/96 DILUTION FACTOR 1.00
All results reported in ug/L

CAS NO.	COMPOUND	RESULT	DET LIMIT
71-43-2	Benzene	U	1.0
108-88-3	Toluene	U	1.0
108-90-7	Chlorobenzene	U	1.0
100-41-4	Ethylbenzene	U	1.0
108-38-3	m+p-Xylenes	U	2.0
95-47-6	o-Xylene	U	1.0
541-73-1	1,3-Dichlorobenzene	U	1.0
106-46-7	1,4-Dichlorobenzene	U	1.0
95-50-1	1,2-Dichlorobenzene	U	1.0
1634-04-4	methyl-t-butyl ether	U	1.0

SURROGATES

Toluene-d8 96% recovery

NOTES AND DEFINITIONS FOR THIS REPORT.

U = not detected at detection limit

This report is rendered upon all of the following conditions: Thermo Analytical retains ownership of this report until associated submitted invoice is satisfied. Expert witness services shall be available in conjunction with this report only if prior notification of this potential requirement was made and accepted before the analysis. Client will be responsible for Thermo Analytical costs and consulting fees if our services are required by subpoena or otherwise in legal proceedings. Total liability is limited to the invoice amount. The results listed refer only to tested samples and applicable parameters. Samples are not analyzed in accordance with New York State protocol unless indicated. Product endorsement is neither inferred nor implied. Thermo Analytical will exercise due diligence but will not be responsible for lost or destroyed samples or evidence unless client makes appropriate insurance coverage arrangements. Samples are held for thirty days following issuance of report. Samples will be stored at client's expense, if authorized in writing.

SW-846 Method 8100-Modified - Polynuclear Aromatic Hydrocarbons (Modified for the determination and characterization of Total Petroleum Hydrocarbons in soil samples) Comparisons were made to the reference materials based on peak pattern and retention time windows.

SW846 Method 8020 target compound list analyzed for Aromatic Volatile Organics by Gas Chromatography/Mass Spectrometry SW846 Method 8260 (modified to include methyl-t-butyl ether)

USEPA Test Methods for Evaluating Solid Wastes (SW846, Third Edition)
Method 8240 -- Gas Chromatography/Mass Spectrometry for Volatile Organics in water samples

EPA600/4-79-020 - Petroleum Hydrocarbons in Water, Total Recoverable
Method 418.1 (Spectrophotometric, Infrared)

This report is rendered upon all of the following conditions: Thermo Analytical retains ownership of this report until associated submitted invoice is satisfied. Expert witness services shall be available in conjunction with this report only if prior notification of this potential requirement was made and accepted before the analysis. Client will be responsible for Thermo Analytical costs and consulting fees if our services are required by subpoena or otherwise in legal proceedings. Total liability is limited to the invoice amount. The results listed refer only to tested samples and applicable parameters. Samples are not analyzed in accordance with New York State protocol unless indicated. Product endorsement is neither inferred nor implied. Thermo Analytical will exercise due diligence but will not be responsible for lost or destroyed samples or evidence unless client makes appropriate insurance coverage arrangements. Samples are held for thirty days following issuance of report. Samples will be stored at client's expense, if authorized in writing.

PROJECT DISCUSSION

TPH IR Analysis

Sample B-1 was initially extracted at a 2X dilution (500 ml initial volume rather than the usual 1000 ml) due to the nature of the sample. The extract was still a black murky color and the initial analysis performed on 7/31/96 yielded an undetected result. The sample was re-extracted at a 100X dilution on 8/1/96 and re-analyzed on 8/1/96 at a further 10X dilution yielded the 17,500 mg/L result reported here.

TPH 8100M Analysis

Due to the nature of sample B-2, the sample was treated as a waste dilution. Thus, 1 gram of the waste was extracted and reduced to a 5 ml final volume. The results are reported in mg/kg.

C H A I N O F C U S T O D Y R E C O R D

Laboratory: Thermo Analytical

Project Name: VFW Parkway - W. Roxbury

Project Number: 496-197

Collector: William Mourey
(Signature) *William Mourey*

IES Staff: Daniel Jaffe

Sample Identification	Date	Time	Sample Type		Number of Containers	Analysis Requested
			Water	Soil		
1	7-20-96	PM	X		2-40 ml VOA's	EPA 8020
2		PM	X		2-40 ml VOA's	EPA 8240
3		AM	X		2-40 ml VOA's	EPA 8020
4		PM	X		2-40 ml VOA's	EPA 8020
-5		AM	X		2-40 ml VOA's	EPA 8020
-6		AM	X		2-40 ml VOA's	EPA 8020
Blank		AM	X		1-40 ml VOA	EPA 8020
B-1		PM	X		1-16L Amb.	TPH - IR
B-2		PM	X		1-16L Amb. 2-40 ml VOA's	TPH - GC/FID
B-3		AM	X		1-16L Amb.	TPH - IR
B-4		PM	X		1-16L Amb.	TPH - IR
B-5		AM	X		1-16L Amb.	TPH - IR
B-6		AM	X		1-16L Amb.	TPH - IR
Blank		AM	X		1-16L Amb.	TPH - IR
Quished By: <i>William Mourey</i>			Received By: <i>[Signature]</i>			Date/ Time: <i>7/20/96</i>
Quished By: <i>[Signature]</i>			Received By: <i>[Signature]</i>			Date/ Time: <i>[Signature]</i>
Quished By: <i>[Signature]</i>			Received By: <i>[Signature]</i>			Date/ Time: <i>[Signature]</i>
Quished By: <i>[Signature]</i>			Received By: <i>[Signature]</i>			Date/ Time: <i>[Signature]</i>

Notes: Please fax results to 617-629-2920

samples preserved with HCL & sealed in wet ice bags - in field.
samples may be Hot!! or warm!!
2 VOA's for GC/FID are submitted as additional samples, only, if necessary
submit the GC/FID on VOA's B-2.



IEA

An Aquarion Company

IEA, Inc.
149 Rangeway Road
North Billerica, MA 01862

Phone 508-867-1400
Fax 508-867-7871

Mr. Daniel Jaffe
IES, Inc.
265 Medford Street
Suite 312
Somerville, MA 02143

April 17, 1997

Dear Mr. Jaffe:

Please find enclosed the analytical results of the sample(s) received at our laboratory on April 10, 1997. This report contains sections addressing the following information at a minimum:

- sample ID correspondence table
- analytical results
- chain-of-custody (if applicable)
- definitions of data qualifiers and terminology

Client Project #	797-159	Client Project Name	VFW Parkway- W.Roxbury
IEA Report #	1100-737	Purchase Order #	N/A

Copies of this analytical report and supporting data are maintained in our files for a minimum of 3 years unless special arrangements are made. Unless specifically indicated, all analytical testing was performed at the IEA-Massachusetts laboratory.

We appreciate your selection of our services and welcome any questions or suggestions you may have relative to this report. Please contact your customer service representative at (508) 667-1400 for any additional information. Thank you for utilizing our services and we hope you will consider us for your future analytical needs.

I have reviewed and approved the enclosed data for final release.

Sincerely,

Michael F. Wheeler, Ph.D.
Laboratory Director

IEA/American Environmental Network (MA)
MA-DEP #MA038

MW/dlg

h:\reports\forms\donwin\rf00101.ma

4/17/97, 10:33 am

Monroe,
Connecticut
261-4458

Schaumburg,
Illinois
708-705-0740

Whippany,
New Jersey
201-428-8181

Cary,
North Carolina
919-677-0090



printed on recycled paper

IEA

An Aquarion Company

Sample ID Correspondence Table

Client Sample ID	IEA Sample ID
B-3	I100-737-01
B-6	I100-737-02
Blank	I100-737-03



IEA

An Aquarion Company

Definitions of Data Qualifiers and Terminology

A number of data qualifiers are widely used within the environmental testing industry and may be utilized in our data reports. The following definitions of these qualifiers are included as a service to our clientele. The majority of the qualifiers have evolved from the EPA contract laboratory program (CLP).

- B - This flag is used when the analyte is found in the associated blank as well as in the sample. It indicates possible/probable blank contamination and warns the data user to use caution when applying the results of this analyte.
- BQL - Below Quantitation Limit indicates the compound was not detected in the sample above the practical quantitation limit.
- D - Indicates the compound was diluted below the calibration range.
- E - Indicates that the concentration of the specific compound exceeded the calibration range of the instrument for that particular analysis.
- J - Indicates an estimated value. The compound is determined to be present in the sample based on GC/MS criteria, but the amount is less than the sample quantitation limit. IEA - MA GC/MS reports do not typically report J - marked results. If requested, J - marked results are provided and the report flagged to verify that the data was appropriately reviewed.
- MDL - The method detection limit is defined as the minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero.
- NA - Not applicable or not available.
- ND - Indicates the compound or analyte was not detected in the sample above the method detection limit or the practical quantitation limit for the particular analysis.
- PQL - The practical quantitation limit is the lowest level that can be reliably achieved within specified limits of precision and accuracy during routine operating conditions.



IEA

An Aquarion Company

IEA Laboratory Results

Client: IES, Inc.
 Address: 797-159 VFW Parkway-W. Roxbury
 Date: 04/17/97

IEA ID: I100-737
 Received: 04/10/97

Client ID	Parameter	Results	Units	PQL	Date Analyzed	Analyst	Method
B-3	TPH-IR	BQL	mg/L	0.30	04/16/97	SO	418.1
B-6	TPH-IR	5.4	mg/L	0.30	04/16/97	SO	418.1
Blank	TPH-IR	BQL	mg/L	0.30	04/16/97	SO	418.1

Notes:
 PQL = Practical quantitation limit.
 BQL = Below quantitation limit.



IEA

An Aquarion Company

Analysis Report: EPA Method 8020A -Volatile Aromatics

Client: IES, Inc.
Project: 797-159
Report Date: 04/14/97
Collected: 04/08/97
Received: 04/10/97
Analyzed: 04/13/97
By: GAM

IEA ID: I100-737-01
Sample: B-3
Type: Water
Container: VOA

Dilution Factor: 1

Number	Priority Pollutant Compounds	PQL (ug/L)	Result (ug/L)
1	Benzene		BQL
2	Chlorobenzene		BQL
3	1,2-Dichlorobenzene		BQL
4	1,3-Dichlorobenzene		BQL
5	1,4-Dichlorobenzene		BQL
6	Ethylbenzene		BQL
7	Toluene		BQL
8	Xylenes (Total)		BQL
9	Methyl-t-butylether		BQL

Surrogate Standard Recovery:

1,4-Difluorobenzene 97 %

Comments:

PQL = Practical quantitation limit.

BQL = Below quantitation limit.



IEA

An Aquarion Company

Analysis Report: EPA Method 8020A -Volatile Aromatics

Client: IES, Inc.
Project: 797-159
Report Date: 04/14/97
Collected: 04/08/97
Received: 04/10/97
Analyzed: 04/13/97
By: GAM

IEA ID: I100-737-02
Sample: B-6
Type: Water
Container: VOA

Dilution Factor: 1

Number	Priority Pollutant Compounds	PQL (ug/L)	Result (ug/L)
1	Benzene		
2	Chlorobenzene		8
3	1,2-Dichlorobenzene		BQL
4	1,3-Dichlorobenzene		BQL
5	1,4-Dichlorobenzene		BQL
6	Ethylbenzene		BQL
7	Toluene		BQL
8	Xylenes (Total)		BQL
9	Methyl-t-butylether		2
			50

Surrogate Standard Recovery:

1,4-Difluorobenzene 98 %

Comments:

PQL = Practical quantitation limit.
BQL = Below quantitation limit.



IEA

An Aquarion Company

Analysis Report: EPA Method 8020A -Volatile Aromatics

Client: IES, Inc.
Project: 797-159
Report Date: 04/14/97
Collected: 04/08/97
Received: 04/10/97
Analyzed: 04/13/97
By: GAM

IEA ID: I100-737-03
Sample: Blank
Type: Water
Container: VOA

Dilution Factor: 1

Number	Priority Pollutant Compounds	PQL (ug/L)	Result (ug/L)
1	Benzene		BQL
2	Chlorobenzene		BQL
3	1,2-Dichlorobenzene		BQL
4	1,3-Dichlorobenzene		BQL
5	1,4-Dichlorobenzene		BQL
6	Ethylbenzene		BQL
7	Toluene		BQL
8	Xylenes (Total)		BQL
9	Methyl-t-butylether		BQL

Surrogate Standard Recovery.

1,4-Difluorobenzene 98 %

Comments:

PQL = Practical quantitation limit.

BQL = Below quantitation limit.



970409

100-737

CHAIN OF CUSTODY RECORD

Laboratory: IEA Laboratories, Inc.					
Project Name: VFW Parkway - W Roxbury			Project Number: 797-159		
Sampler: William Mourey			IES Staff: Daniel Jaffe		
Sample Identification	Date	Time	Sample Type Soil Water	Number of Containers	Analysis Requested
B-1			X	1-HL. Amb.	TPH - IR
B-2			X	1-HL. Amb.	TPH - IR
B-3	4-8-97	PM	X	1-HL. Amb.	TPH - IR
B-4			X	1-HL. Amb.	TPH - IR
B-5			X	1-HL. Amb.	TPH - IR
B-6	4-8-97	PM	X	1-HL. Amb.	TPH - IR
Blank	"	PM	X	1-HL. Amb.	TPH - IR
B-1			X	3-40ml UOA	EPA 8020
B-2			X	3-40ml UOA	EPA 8020
B-3	4-8-97	PM	X	3-40ml UOA	EPA 8020
B-4			X	3-40ml UOA	EPA 8020
B-5			X	3-40ml UOA	EPA 8020
B-6	4-8-97	PM	X	3-40ml UOA	EPA 8020
Blank	"	PM	X	1-40ml UOA	EPA 8020
Relinquished by: (Signature) <i>William Mourey</i>			Received by: (Signature) <i>Holly Thompson</i>		Date/Time: 4/10/97 2:30 PM
Relinquished by: (Signature)			Received by: (Signature)		Date/Time
Relinquished by: (Signature)			Received by: (Signature)		Date/Time
Relinquished by: (Signature)			Relinquished by: (Signature)		Date/Time
Comments: Please fax results to (617) 629-2920 10°C					
All samples preserved with HCl & cooled in ice packs in field.					



ANALYTICAL LABORATORIES, INC.

DESIGN CONSULTANTS BUILDING, SUITE 314
265 MEDFORD STREET, SOMERVILLE, MA 02143
(617) 776-0926

TPH Analysis Report

Client:	IES of MA, Inc.	ALI Project No.:	197-828
Address:	265 Medford Street Suite 312 Somerville, MA 02141	Lab ID No T-	304 305
		Date Received:	09-19-97
		Date Analyzed:	09-21-97
		Date of Report:	09-24-97
		Received By::	Lawrence Mach
		Condition:	Cool-Intact
IES Project No.:		797-159	
IES Staff:		Daniel Jaffe	
Project Name/Location:		VFW Parkway - W. Roxbury	
Sample Names:		B-4, BLANK.	
Collected By/Date:		IES of MA, Inc.	09-19-97

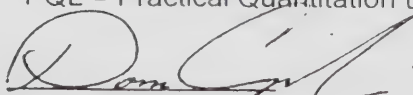
ANALYTICAL RESULTS - TOTAL PETROLEUM HYDROCARBONS BY IR, EPA 418.1

<u>Sample Name</u>	<u>Matrix</u>	<u>Lab ID</u>	<u>TPH</u>	<u>*PQL</u>
B-4	Water	TW- 304	35.5 mg/l	10 mg/l

BLANK	Water	TW- 305	BQL	1 mg/l
-------	-------	---------	-----	--------

Reference Oil Standard; EPA Method Specification; 37.5% n-Hexadecane, 37.5% Iso-Octane,
25% Chlorobenzene (Percentages by Volume)

*PQL = Practical Quantitation Limit


Damian J. Capobianco
Laboratory Director

CHAIN OF CUSTODY RECORD

Laboratory: Analytical Laboratories, Inc.						
Project Name: VFW Parkway - W. Roxbury				Project Number: 797-159		
Sampler: <i>J. R. Deleh</i>				IES Staff: Daniel Jaffe		
Sample Identification	Date	Time	Sample Type		Number of Containers	Analysis Requested
			Soil	Water		
B-4	09.19.97	PM		X		TPH - IR
Blank	1	1		X		TPH - IR
Relinquished by: (Signature) <i>J. R. Deleh</i>			Received by: <i>Lawrence</i>		Date/Time 09.19.97 / 3:57	
Relinquished by: (Signature)			Received by: (Signature)		Date/Time	
Relinquished by: (Signature)			Received by: (Signature)		Date/Time	
Relinquished by: (Signature)			Relinquished by: (Signature)		Date/Time	
Comments:						



ANALYTICAL LABORATORIES, INC.

DESIGN CONSULTANTS BUILDING, SUITE 314
265 MEDFORD STREET, SOMERVILLE, MA 02143
(617) 776-0926

TPH Analysis Report

Client:	IES of MA, Inc.	ALI Project No.:	197-825
Address:	265 Medford Street Suite 312 Somerville, MA 02141	Lab ID No T-	296 298
		Date Received:	09-17-97
		Date Analyzed:	09-19-97
		Date of Report:	09-22-97
		Received By::	Lawrence Mach
		Condition:	Cool-Intact
IES Project No.:		797-159	
IES Staff:		Daniel Jaffe	
Project Name/Location:		VFW Parkway - W. Roxbury	
Sample Names:		B-3,B-6,BLANK.	
Collected By/Date:		IES of MA, Inc.	09-17-97

ANALYTICAL RESULTS - TOTAL PETROLEUM HYDROCARBONS BY IR, EPA 418.1

<u>Sample Name</u>	<u>Matrix</u>	<u>Lab ID</u>	<u>TPH</u>	<u>*PQL</u>
B-3	Water	TW- 296	3.5 mg/l	1 mg/l
B-6	Water	TW- 297	3.2 mg/l	1 mg/l

BLANK	Water	TW- 298	BQL	1 mg/l
-------	-------	---------	-----	--------

Reference Oil Standard; EPA Method Specification; 37.5% n-Hexadecane, 37.5% Iso-Octane,
25% Chlorobenzene (Percentages by Volume)

*PQL = Practical Quantitation Limit

Damian J. Capobianco
Laboratory Director

CHAIN OF CUSTODY RECORD

Laboratory: Analytical Laboratories, Inc.						
Project Name: VFW Parkway - W. Roxbury				Project Number: 797-159		
Sampler: <i>J. R. D. Lile</i>				IES Staff: Daniel Jaffe		
Sample Identification	Date	Time	Sample Type		Number of Containers	Analysis Requested
			Soil	Water		
~~B-1~~				X		~~TPH - IR~~
~~B-2~~				X		~~TPH - IR~~
B-3	09-17-97	PM		X		TPH - IR
~~B-4~~				X		~~TPH - IR~~
~~B-5~~				X		~~TPH - IR~~
B-6	09-17-97	PM		X		TPH - IR
Blank	09-17-97	PM		X		TPH - IR
Relinquished by: <i>J. R. D. Lile</i>			Received by: <i>Lucas Mel</i>			Date/Time: 09/17/97 3:00
Relinquished by: (Signature)			Received by: (Signature)			Date/Time
Relinquished by: (Signature)			Received by: (Signature)			Date/Time
Relinquished by: (Signature)			Relinquished by: (Signature)			Date/Time
Comments:						



IEA

An Aquarion Company

IEA, Inc.
149 Rangeway Road
North Billerica, MA 01862

Phone 508-667-1400
Fax 508-667-7871

Mr. Daniel Jaffe
IES, Inc.
265 Medford Street
Suite 312
Somerville, MA 02143

September 24, 1997

Dear Mr. Jaffe:

Please find enclosed the analytical results of the sample(s) received at our laboratory on September 18, 1997. This report contains sections addressing the following information at a minimum:

- sample ID correspondence table
- analytical results
- chain-of-custody (if applicable)
- definitions of data qualifiers and terminology

Client Project #	797-159	Client Project Name	VFW Parkway-West Rox
AEN Report #	I100-787	Purchase Order #	N/A

Copies of this analytical report and supporting data are maintained in our files for a minimum of 3 years unless special arrangements are made. Unless specifically indicated, all analytical testing was performed at the IEA-Massachusetts laboratory.

We appreciate your selection of our services and welcome any questions or suggestions you may have relative to this report. Please contact your customer service representative at (508) 667-1400 for any additional information. Thank you for utilizing our services and we hope you will consider us for your future analytical needs.

I have reviewed and approved the enclosed data for final release.

Sincerely,

Michael F. Wheeler, Ph.D.
Laboratory Director

IEA/American Environmental Network (MA)
MA-DEP #MA038

MW/dib

h:\reports\forms\dconwin\rf00101.ma

9/24/97, 4:46 pm

proe,
necticut
20 61-4458

Schaumburg,
Illinois
708-705-0740

Whippany,
New Jersey
201-428-8181

Cary,
North Carolina
919-677-0090

Sample ID Correspondence Table

Client Sample ID	AEN Sample ID
B-3	I100-787-01
B-6	I100-787-02
Blank	I100-787-03

Definitions of Data Qualifiers and Terminology

A number of data qualifiers are widely used within the environmental testing industry and may be utilized in our data reports. The following definitions of these qualifiers are included as a service to our clientele. The majority of the qualifiers have evolved from the EPA contract laboratory program (CLP).

- B - This flag is used when the analyte is found in the associated blank as well as in the sample. It indicates possible/probable blank contamination and warns the data user to use caution when applying the results of this analyte.
- BQL - Below Quantitation Limit indicates the compound was not detected in the sample above the practical quantitation limit.
- D - Indicates the compound was diluted below the calibration range.
- E - Indicates that the concentration of the specific compound exceeded the calibration range of the instrument for that particular analysis.
- J - Indicates an estimated value. The compound is determined to be present in the sample based on GC/MS criteria, but the amount is less than the sample quantitation limit. IEA - MA GC/MS reports do not typically report J - marked results. If requested, J - marked results are provided and the report flagged to verify that the data was appropriately reviewed.
- MDL - The method detection limit is defined as the minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero.
- NA - Not applicable or not available.
- ND - Indicates the compound or analyte was not detected in the sample above the method detection limit or the practical quantitation limit for the particular analysis.
- PQL - The practical quantitation limit is the lowest level that can be reliably achieved within specified limits of precision and accuracy during routine operating conditions.

AEN - Massachusetts
Analysis Report: EPA Method 8020A -Volatile Aromatics

Client:	IES, Inc.	AEN ID:	I100-787-01
Project:	797-159 VFW Parkway-West Rox	Sample:	B-3
Report Date:	09/24/97	Type:	Water
Collected:	09/17/97	Container:	VOA
Received:	09/18/97		
Analyzed:	09/20/97	Dilution Factor:	1
By:	GAM		

Number	Priority Pollutant Compounds	PQL (ug/L)	Result (ug/L)
1	Benzene	1	BQL
2	Chlorobenzene	1	BQL
3	1,2-Dichlorobenzene	1	BQL
4	1,3-Dichlorobenzene	1	BQL
5	1,4-Dichlorobenzene	1	BQL
6	Ethylbenzene	1	BQL
7	Toluene	1	BQL
8	Xylenes (Total)	1	BQL
9	Methyl-t-butylether	1	BQL

Surrogate Standard Recovery:

1,4-Difluorobenzene 88 %

Comments:

PQL = Practical quantitation limit.

BQL = Below quantitation limit.

AEN - Massachusetts
Analysis Report: EPA Method 8020A -Volatile Aromatics

Client:	IES, Inc.	AEN ID:	I100-787-02
Project:	797-159 VFW Parkway-West Rox	Sample:	B-6
Report Date:	09/24/97	Type:	Water
Collected:	09/17/97	Container:	VOA
Received:	09/18/97		
Analyzed:	09/20/97	Dilution Factor:	1
By:	GAM		

Number	Priority Pollutant Compounds	PQL (ug/L)	Result (ug/L)
1	Benzene	1	21
2	Chlorobenzene	1	
3	1,2-Dichlorobenzene	1	
4	1,3-Dichlorobenzene	1	
5	1,4-Dichlorobenzene	1	
6	Ethylbenzene	1	BQL
7	Toluene	1	BQL
8	Xylenes (Total)	1	2
9	Methyl-t-butylether	1	3
			8

Surrogate Standard Recovery:

1,4-Difluorobenzene 89 %

Comments:

PQL = Practical quantitation limit.

BQL = Below quantitation limit.

AEN - Massachusetts
Analysis Report: EPA Method 8020A -Volatile Aromatics

Client:	IES, Inc.	AEN ID:	I100-787-03
Project:	797-159 VFW Parkway-West Rox	Sample:	Blank
Report Date:	09/24/97	Type:	Water
Collected:	09/17/97	Container:	VOA
Received:	09/18/97		
Analyzed:	09/20/97	Dilution Factor:	1
By:	GAM		

Number	Priority Pollutant Compounds	PQL (ug/L)	Result (ug/L)
1	Benzene	1	BQL
2	Chlorobenzene	1	BQL
3	1,2-Dichlorobenzene	1	BQL
4	1,3-Dichlorobenzene	1	BQL
5	1,4-Dichlorobenzene	1	BQL
6	Ethylbenzene	1	BQL
7	Toluene	1	BQL
8	Xylenes (Total)	1	BQL
9	Methyl-t-butylether	1	BQL

Surrogate Standard Recovery:

1,4-Difluorobenzene 88 %

Comments:

PQL = Practical quantitation limit.

BQL = Below quantitation limit.

9709K3/I-60-78

CHAIN OF CUSTODY RECORD

Laboratory: IEA Laboratories, Inc.						
Project Name: VFW Parkway - West Roxbury				Project Number: 797-159		
Sampler: <i>J. R. D. Lohr</i>				IES Staff: Daniel Jaffe		
Sample Identification	Date	Time	Sample Type		Number of Containers	Analysis Requested
			Soil	Water		
~~B-1~~				X		EPA 8020
~~B-2~~				X		EPA 8020
B-3				X		EPA 8020
B-4				X		EPA 8020
~~B-5~~				X		EPA 8020
B-6				X		EPA 8020
Blank				X		EPA 8020
Relinquished by (Signature) <i>J. R. D. Lohr</i>			Received by (Signature) <i>Daniel Jaffe</i>		Date/Time <i>7/17/02</i>	
Relinquished by (Signature)			Received by (Signature)		Date/Time	
Relinquished by (Signature)			Received by (Signature)		Date/Time	
Relinquished by (Signature)			Relinquished by (Signature)		Date/Time	
Comments: Please fax results to (617) 629-2920						
<i>collected 7/17 per bottles -</i>						



American Environmental Network

149 Rangeway Road • N. Billerica, MA 01862 • (978) 667-1400 • Fax (978) 667-7871

Mr. Daniel Jaffe
IES, Inc.
265 Medford Street
Suite 312
Somerville, MA 02143

September 29, 1997

Dear Mr. Jaffe:

Please find enclosed the analytical results of the sample(s) received at our laboratory on September 22, 1997. This report contains sections addressing the following information at a minimum:

- sample ID correspondence table
- analytical results
- chain-of-custody (if applicable)
- definitions of data qualifiers and terminology

Client Project #	797-159	Client Project Name	West Roxbury
AEN Report #	1100-789	Purchase Order #	N/A

Copies of this analytical report and supporting data are maintained in our files for a minimum of 3 years unless special arrangements are made. Unless specifically indicated, all analytical testing was performed at the IEA-Massachusetts laboratory.

We appreciate your selection of our services and welcome any questions or suggestions you may have relative to this report. Please contact your customer service representative at (508) 667-1400 for any additional information. Thank you for utilizing our services and we hope you will consider us for your future analytical needs.

I have reviewed and approved the enclosed data for final release.

Sincerely,

Michael F. Wheeler, Ph.D.
Laboratory Director

IEA/American Environmental Network (MA)
MA-DEP #MA038

MW/dib

h:\reports\forms\dconwin\rpf00101.ma

9/29/97, 3:53 pm

Sample ID Correspondence Table

Client Sample ID	AEN Sample ID
B-4	I100-789-01
Blank	I100-789-02

Definitions of Data Qualifiers and Terminology

A number of data qualifiers are widely used within the environmental testing industry and may be utilized in our data reports. The following definitions of these qualifiers are included as a service to our clientele. The majority of the qualifiers have evolved from the EPA contract laboratory program (CLP).

- B - This flag is used when the analyte is found in the associated blank as well as in the sample. It indicates possible/probable blank contamination and warns the data user to use caution when applying the results of this analyte.
- BQL - Below Quantitation Limit indicates the compound was not detected in the sample above the practical quantitation limit.
- D - Indicates the compound was diluted below the calibration range.
- E - Indicates that the concentration of the specific compound exceeded the calibration range of the instrument for that particular analysis.
- J - Indicates an estimated value. The compound is determined to be present in the sample based on GC/MS criteria, but the amount is less than the sample quantitation limit. IEA - MA GC/MS reports do not typically report J - marked results. If requested, J - marked results are provided and the report flagged to verify that the data was appropriately reviewed.
- MDL - The method detection limit is defined as the minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero.
- NA - Not applicable or not available.
- ND - Indicates the compound or analyte was not detected in the sample above the method detection limit or the practical quantitation limit for the particular analysis.
- PQL - The practical quantitation limit is the lowest level that can be reliably achieved within specified limits of precision and accuracy during routine operating conditions.

AEN - Massachusetts
Analysis Report: EPA Method 8020A -Volatile Aromatics

Client: IES, Inc.
Project: 797-159/West Roxbury
Report Date: 09/29/97
Collected: 09/19/97
Received: 09/22/97
Analyzed: 09/27/97
By: GAM

AEN ID: I100-789-01
Sample: B-4
Type: Water
Container: VOA

Dilution Factor: 1

Number	Priority Pollutant Compounds	PQL (ug/L)	Result (ug/L)
1	Benzene	1	31
2	Chlorobenzene	1	2
3	1,2-Dichlorobenzene	1	BQL
4	1,3-Dichlorobenzene	1	BQL
5	1,4-Dichlorobenzene	1	BQL
6	Ethylbenzene	1	19
7	Toluene	1	3
8	Xylenes (Total)	1	48
9	Methyl-t-butylether	1	4

Surrogate Standard Recovery:

1,4-Difluorobenzene 102 %

Comments:

PQL = Practical quantitation limit.

BQL = Below quantitation limit.

AEN - Massachusetts
Analysis Report: EPA Method 8020A -Volatile Aromatics

Client: IES, Inc.
Project: 797-159/West Roxbury
Report Date: 09/29/97
Collected: 09/19/97
Received: 09/22/97
Analyzed: 09/25/97
By: GAM

AEN ID: I100-789-02
Sample: Blank
Type: Water
Container: VOA

Dilution Factor: 1

Number	Priority Pollutant Compounds	PQL (ug/L)	Result (ug/L)
1	Benzene	1	BQL
2	Chlorobenzene	1	BQL
3	1,2-Dichlorobenzene	1	BQL
4	1,3-Dichlorobenzene	1	BQL
5	1,4-Dichlorobenzene	1	BQL
6	Ethylbenzene	1	BQL
7	Toluene	1	BQL
8	Xylenes (Total)	1	BQL
9	Methyl-t-butylether	1	BQL

Surrogate Standard Recovery:

1,4-Difluorobenzene 88 %

Comments:

PQL = Practical quantitation limit.

BQL = Below quantitation limit.

CHAIN OF CUSTODY RECORD

[illegible]

03/17/98

Technical Report for

IES, Inc.

VFW Pkwy. West. Roxbury

797-159

Accutest Job Number: M3910

Report to:

IES, Inc.
265 Medford St.
Sommerville, MA 02143

ATTN: Danneil Jaffe

Total number of pages in report: 11



Reza Tand
Lab Director

Certifications: MA (MA136) CT (PH-0109) NH (250293) NJ (59928) RI (A-71) ME (MA136)

Results relate only to the items tested.

This report shall not be reproduced, except in its entirety, without the written approval of Accutest Laboratories.



Sample Summary

IES, Inc.

Date: 03/16/98

Job No: M3910

VFW Pkwy. West. Roxbury
Project No: 797-159

Sample Number	Collected Date	Time By	Received	Matrix Code Type	Client Sample ID
M3910-1	03/05/98	00:00 KA	03/09/98	AQ Ground Water	B-3
M3910-2	03/05/98	00:00 KA	03/09/98	AQ Ground Water	B-4
M3910-3	03/05/98	00:00 KA	03/09/98	AQ Ground Water	B-5
M3910-4	03/05/98	00:00 KA	03/09/98	AQ Ground Water	BLANK
M3910-5	03/05/98	00:00 KA	03/09/98	AQ Ground Water	B-3
M3910-6	03/05/98	00:00 KA	03/09/98	AQ Ground Water	B-4
M3910-7	03/05/98	00:00 KA	03/09/98	AQ Ground Water	B-5
M3910-8	03/05/98	00:00 KA	03/09/98	AQ Ground Water	BLANK



Report of Analysis

Page 1 of 1

Client Sample ID: B-3
Lab Sample ID: M3910-1
Matrix: AQ - Ground Water
Method: MADEP VPH
Project: VFW Pkwy. West. Roxbury

Date Sampled: 03/05/98

Date Received: 03/09/98

Percent Solids: n/a

Run #1	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #2	GCE9463.D	1	03/12/98	SEP	n/a	n/a	GCE318

MA-VPH List

CAS No.	Compound	Result	RDL	Units	Q
	C5- C8 Aliphatics	68.0	10	ug/l	
	C9- C12 Aliphatics	938	10	ug/l	
	C9- C10 Aromatics	619	2.0	ug/l	
71-43-2	Benzene	ND	2.0	ug/l	
100-41-4	Ethylbenzene	ND	2.0	ug/l	
1634-04-4	Methyl Teri Butyl Ether	2.8	2.0	ug/l	
91-20-3	Naphthalene	6.8	2.0	ug/l	
108-88-3	Toluene	ND	2.0	ug/l	
	m,p-Xylene	6.4	2.0	ug/l	
95-47-6	o-Xylene	ND	2.0	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
615-59-8	2,5-Dibromotoluene	103 %		60-140 %
615-59-8	2,5-Dibromotoluene	127 %		60-140 %

Report of Analysis

Page 1 of 1

Client Sample ID:	B-4		
Lab Sample ID:	M3910-2	Date Sampled:	03/05/98
Matrix:	AQ - Ground Water	Date Received:	03/09/98
Method:	MADEP VPH	Percent Solids:	n/a
Project:	VFW Pkwy. West. Roxbury		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GCE9464.D	1	03/12/98	SEP	n/a	n/a	GCE318
Run #2							

MA-VPH List

CAS No.	Compound	Result	RDL	Units	Q
	C5- C8 Aliphatics	178	10	ug/l	
	C9- C12 Aliphatics	1520	10	ug/l	
	C9- C10 Aromatics	1150	2.0	ug/l	
71-43-2	Benzene	6.8	2.0	ug/l	
100-41-4	Ethylbenzene	ND	2.0	ug/l	
1634-04-4	Methyl Tert Butyl Ether	ND	2.0	ug/l	
91-20-3	Naphthalene	27.3	2.0	ug/l	
108-88-3	Toluene	2.6	2.0	ug/l	
	m,p-Xylene	11.7	2.0	ug/l	
95-47-6	o-Xylene	5.8	2.0	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
615-59-8	2,5-Dibromotoluene	116 %		60-140 %
615-59-8	2,5-Dibromotoluene	129 %		60-140 %

ND = Not detected
 RDL = Reported Detection Limit
 E = Indicates value exceeds calibration range

J = Indicates an estimated value
 B = Indicates that analyte is found in associated method blank
 N = Indicates presumptive evidence of a compound



Report of Analysis

Page 1 of 1

Client Sample ID: B-5
Lab Sample ID: M3910-3
Matrix: AQ - Ground Water
Method: MADEP VPH
Project: VFW Pkwy. West. Roxbury

Date Sampled: 03/05/98
Date Received: 03/09/98
Percent Solids: n/a

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GCE9465.D	1	03/13/98	SEP	n/a	n/a	GCE318
Run #2							

MA-VPH List

CAS No.	Compound	Result	RDL	Units	Q
	C5- C8 Aliphatics	196	10	ug/l	
	C9- C12 Aliphatics	308	10	ug/l	
	C9- C10 Aromatics	179	2.0	ug/l	
71-43-2	Benzene	8.2	2.0	ug/l	
100-41-4	Ethylbenzene	4.0	2.0	ug/l	
1634-04-4	Methyl Tert Butyl Ether	3.8	2.0	ug/l	
91-20-3	Naphthalene	2.9	2.0	ug/l	
108-88-3	Toluene	2.4	2.0	ug/l	
	m,p-Xylene	8.6	2.0	ug/l	
95-47-6	o-Xylene	8.7	2.0	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
615-59-8	2,5-Dibromotoluene	105 %		60-140 %
615-59-8	2,5-Dibromotoluene	125 %		60-140 %



Report of Analysis

Page 1 of 1

Client Sample ID: BLANK
Lab Sample ID: M3910-4
Matrix: AQ - Ground Water
Method: MADEP VPH
Project: VFW Pkwy. West. Roxbury

Date Sampled: 03/05/98
Date Received: 03/09/98
Percent Solids: n/a

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GCE9459.D	1	03/12/98	SEP	n/a	n/a	GCE318
Run #2							

MA-VPH List

CAS No.	Compound	Result	RDL	Units	Q
	C5- C8 Aliphatics	ND	10	ug/l	
	C9- C12 Aliphatics	ND	10	ug/l	
	C9- C10 Aromatics	ND	2.0	ug/l	
71-43-2	Benzene	ND	2.0	ug/l	
100-41-4	Ethylbenzene	ND	2.0	ug/l	
1634-04-4	Methyl Tert Butyl Ether	ND	2.0	ug/l	
91-20-3	Naphthalene	ND	2.0	ug/l	
108-88-3	Toluene	ND	2.0	ug/l	
	m,p-Xylene	ND	2.0	ug/l	
95-47-6	o-Xylene	ND	2.0	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
615-59-8	2,5-Dibromotoluene	94 %		60-140 %
615-59-8	2,5-Dibromotoluene	111 %		60-140 %

ND = Not detected
RDL = Reported Detection Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates that analyte is found in associated method blank
N = Indicates presumptive evidence of a compound



Report of Analysis

Page 1 of 1

Client Sample ID: B-3
Lab Sample ID: M3910-5
Matrix: AQ - Ground Water
Method: MADEP EPH
Project: VFW Pkwy. West. Roxbury

Date Sampled: 03/05/98

Date Received: 03/09/98

Percent Solids: n/a

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GD12446.D	1	03/12/98	AF	03/10/98	OP496	GCD453
Run #2	GD12455.D	1	03/13/98	AF	03/10/98	OP496	GCD452

ABN Special List

CAS No.	Compound	Result	RDL	Units	Q
	C9-C18 Aliphatics	ND ^a	2.6	ug/l	
	C19-C36 Aliphatics	ND ^a	2.6	ug/l	
	C11-C22 Aromatics	ND	2.6	ug/l	
83-32-9	Acenaphthene	ND	2.6	ug/l	
208-96-8	Acenaphthylene	ND	2.6	ug/l	
120-12-7	Anthracene	ND	2.6	ug/l	
56-55-3	Benzo (a) anthracene	ND	2.6	ug/l	
50-32-8	Benzo (a) pyrene	ND	2.6	ug/l	
205-99-2	Benzo (b) fluoranthene	ND	2.6	ug/l	
191-24-2	Benzo (g,h,i) perylene	ND	2.6	ug/l	
207-08-9	Benzo (k) fluoranthene	ND	2.6	ug/l	
218-01-9	Chrysene	ND	2.6	ug/l	
53-70-3	Dibenz(a,h)anthracene	ND	2.6	ug/l	
206-44-0	Fluoranthene	ND	2.6	ug/l	
86-73-7	Fluorene	ND	2.6	ug/l	
193-39-5	Indeno (1,2,3-cd) pyrene	ND	2.6	ug/l	
91-57-6	2-Methylnaphthalene	ND	2.6	ug/l	
91-20-3	Naphthalene	ND	2.6	ug/l	
85-01-8	Phenanthrene	ND	2.6	ug/l	
129-00-0	Pyrene	ND	2.6	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	80%		40-140%
3386-33-2	1-Chlorooctadecane		84%	40-140%

(a) Result is from Run# 2

**ACCUTEST**

Report of Analysis

Page 1 of 1

Client Sample ID:	B-4	Date Sampled:	03/05/98
Lab Sample ID:	M3910-6	Date Received:	03/09/98
Matrix:	AQ - Ground Water	Percent Solids:	n/a
Method:	MADEP EPH		
Project:	VFW Pkwy. West. Roxbury		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GD12448.D	1	03/12/98	AF	03/10/98	OP496	GCD453
Run #2	GD12457.D	1	03/13/98	AF	03/10/98	OP496	GCD452

ABN Special List

CAS No.	Compound	Result	RDL	Units	Q
	C9-C18 Aliphatics	1690 ^a	2.7	ug/l	
	C19-C36 Aliphatics	9620 ^a	2.7	ug/l	
	C11-C22 Aromatics	383	2.7	ug/l	
83-32-9	Acenaphthene	ND	2.7	ug/l	
208-96-8	Acenaphthylene	2.8	2.7	ug/l	
120-12-7	Anthracene	ND	2.7	ug/l	
56-55-3	Benzo (a) anthracene	ND	2.7	ug/l	
50-32-8	Benzo (a) pyrene	ND	2.7	ug/l	
205-99-2	Benzo (b) fluoranthene	ND	2.7	ug/l	
191-24-2	Benzo (g,h,i) perylene	ND	2.7	ug/l	
207-08-9	Benzo (k) fluoranthene	ND	2.7	ug/l	
218-01-9	Chrysene	ND	2.7	ug/l	
53-70-3	Dibenz(a,h)anthracene	ND	2.7	ug/l	
206-44-0	Fluoranthene	ND	2.7	ug/l	
86-73-7	Fluorene	ND	2.7	ug/l	
193-39-5	Indeno (1,2,3-cd) pyrene	ND	2.7	ug/l	
91-57-6	2-Methylnaphthalene	6.1	2.7	ug/l	
91-20-3	Naphthalene	16.7	2.7	ug/l	
85-01-8	Phenanthrene	ND	2.7	ug/l	
129-00-0	Pyrene	ND	2.7	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	71 %		40-140 %
3386-33-2	1-Chlorooctadecane		80 %	40-140 %

(a) Result is from Run# 2

ND = Not detected

RDL = Reported Detection Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates that analyte is found in associated method blank

N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	B-5	Date Sampled:	03/05/98
Lab Sample ID:	M3910-7	Date Received:	03/09/98
Matrix:	AQ - Ground Water	Percent Solids:	n/a
Method:	MADEP EPH		
Project:	VFW Pkwy. West. Roxbury		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GD12450.D	1	03/12/98	AF	03/10/98	OP496	GCD453
Run #2	GD12458.D	1	03/13/98	AF	03/10/98	OP496	GCD452

ABN Special List

CAS No.	Compound	Result	RDL	Units	Q
	C9-C18 Aliphatics	ND ^a	2.9	ug/l	
	C19-C36 Aliphatics	1820 ^a	2.9	ug/l	
	C11-C22 Aromatics	ND	2.9	ug/l	
83-32-9	Acenaphthene	ND	2.9	ug/l	
208-96-8	Acenaphthylene	ND	2.9	ug/l	
120-12-7	Anthracene	ND	2.9	ug/l	
56-55-3	Benzo (a) anthracene	ND	2.9	ug/l	
50-32-8	Benzo (a) pyrene	ND	2.9	ug/l	
205-99-2	Benzo (b) fluoranthene	ND	2.9	ug/l	
191-24-2	Benzo (g,h,i) perylene	ND	2.9	ug/l	
207-08-9	Benzo (k) fluoranthene	ND	2.9	ug/l	
218-01-9	Chrysene	ND	2.9	ug/l	
53-70-3	Dibenz(a,h)anthracene	ND	2.9	ug/l	
206-44-0	Fluoranthene	ND	2.9	ug/l	
86-73-7	Fluorene	ND	2.9	ug/l	
193-39-5	Indeno (1,2,3-cd) pyrene	ND	2.9	ug/l	
91-57-6	2-Methylnaphthalene	ND	2.9	ug/l	
91-20-3	Naphthalene	ND	2.9	ug/l	
85-01-8	Phenanthrene	ND	2.9	ug/l	
129-00-0	Pyrene	ND	2.9	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	82 %		40-140 %
3386-33-2	1-Chlorooctadecane		76 %	40-140 %

(a) Result is from Run# 2

ND = Not detected
RDL = Reported Detection Limit
J = Indicates an estimated value
B = Indicates that analyte is found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Page 1 of 1

Client Sample ID: BLANK
 Lab Sample ID: M3910-8
 Matrix: AQ - Ground Water
 Method: MADEP EPH
 Project: VFW Pkwy. West. Roxbury

Date Sampled: 03/05/98
 Date Received: 03/09/98
 Percent Solids: n/a

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GD12533.D	1	03/16/98	AF	03/16/98	OP496	GCD459
Run #2	GD12544.D	1	03/17/98	AF	03/16/98	OP496	GCD460

ABN Special List

CAS No.	Compound	Result	RDL	Units	Q
	C9-C18 Aliphatics	ND	2.6	ug/l	
	C19-C36 Aliphatics	ND	2.6	ug/l	
	C11-C22 Aromatics	ND ^a	2.6	ug/l	
83-32-9	Acenaphthene	ND ^a	2.6	ug/l	
208-96-8	Acenaphthylene	ND ^a	2.6	ug/l	
120-12-7	Anthracene	ND ^a	2.6	ug/l	
56-55-3	Benzo (a) anthracene	ND ^a	2.6	ug/l	
50-32-8	Benzo (a) pyrene	ND ^a	2.6	ug/l	
205-99-2	Benzo (b) fluoranthene	ND ^a	2.6	ug/l	
191-24-2	Benzo (g,h,i) perylene	ND ^a	2.6	ug/l	
207-08-9	Benzo (k) fluoranthene	ND ^a	2.6	ug/l	
218-01-9	Chrysene	ND ^a	2.6	ug/l	
53-70-3	Dibenz(a,h)anthracene	ND ^a	2.6	ug/l	
206-44-0	Fluoranthene	ND ^a	2.6	ug/l	
86-73-7	Fluorene	ND ^a	2.6	ug/l	
193-39-5	Indeno (1,2,3-cd) pyrene	ND ^a	2.6	ug/l	
91-57-6	2-Methylnaphthalene	ND ^a	2.6	ug/l	
91-20-3	Naphthalene	ND ^a	2.6	ug/l	
85-01-8	Phenanthrene	ND ^a	2.6	ug/l	
129-00-0	Pyrene	ND ^a	2.6	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl		98%	40-140%
3386-33-2	1-Chlorooctadecane	80%		40-140%

(a) Result is from Run# 2



Committed To Your Success

Mr. Daniel Jaffe
IES, Inc.
265 Medford Street
Suite 312
Somerville, MA 02143

Severn Trent Laboratories
149 Rangway Road
North Billerica MA 01862
Tel: (978) 667-1400
Fax: (978) 667-7871

July 14, 1998

Dear Mr. Jaffe:

Please find enclosed the analytical results of the sample(s) received at our laboratory on July 06, 1998. This report contains sections addressing the following information at a minimum:

- sample ID correspondence table
- analytical results
- chain-of-custody (if applicable)
- definitions of data qualifiers and terminology

Client Project #	797-159	Client Project Name	VFW Parkway-W.Roxbury
AEN Report #	1100-901	Purchase Order #	N/A

Copies of this analytical report and supporting data are maintained in our files for a minimum of 3 years unless special arrangements are made. Unless specifically indicated, all analytical testing was performed at the IEA-Massachusetts laboratory.

We appreciate your selection of our services and welcome any questions or suggestions you may have relative to this report. Please contact your customer service representative at (978) 667-1400 for any additional information. Thank you for utilizing our services and we hope you will consider us for your future analytical needs.

I have reviewed and approved the enclosed data for final release.

Sincerely,

Michael F. Wheeler, Ph.D.
Laboratory Director

IEA/American Environmental Network (MA)
MA-DEP #MA038

MW/dib

h:\reports\forms\lcomwin\rf00101.rua

7/14/98, 2:02 pm

Other Laboratory Locations:

- 16203 Park Row, Suite 110, Houston TX 77064
- 200 Morris Turnpike, Morris CT 06468
- 120 Southpointe Court, Suite 300, Morrisville NC 27560

- 315 Fulton Avenue, Newburgh NY 12550
- 17 East Olive Road, Pensacola FL 32514
- Woodfield Executive Park, 53 Southampton Road, Woodfield MA 01086
- 629 Route 10, Whippany NJ 07981

part of
Severn Trent Services Inc

Sample ID Correspondence Table

Client Sample ID	AEN Sample ID
B-3	I100-901-01
B-4	I100-901-02
B-5	I100-901-03
B-6	I100-901-04
Blank	I100-901-05

VPH/EPH CERTIFICATION

The samples in this data set were analyzed by the MADEP VPH and/or EPH Methods (Revision 0 January 1998). The following information is provided relative to sample receipt, QA/QC procedures and method modifications.

Sample Receipt:

- Sample containers were received in satisfactory condition.
- Samples were received at 4 ± 2 °C or on ice.
- Aqueous samples were preserved properly.
- VPH soil samples were properly preserved with methanol ($1:1 \pm 25\%$; covered soil).

QA/QC Procedures:

- All QA/QC procedures required by the EPH/VPH Methods were followed.
- All method performance/acceptance standards for required QA/QC procedures were achieved. The method specified surrogate standard recovery ranges are 40%-140% (EPH) and 70%-130% (VPH). The following exceptions are noted:
 - Sample Blank(I100-901-05) resulted in a 2-bromonaphthalene recovery(fractionation surrogate) below the method specified limit. Since the sample did not contain any reportable target compounds nor reportable hydrocarbon ranges no corrective action was taken.

Method Modifications:

- No significant modifications were made to the EPH or VPH Methods.

Certification:

The signature on the report cover page serves as the attestation for the method specified certification:

I attest under the pains of perjury that, based upon my inquiry of those individuals immediately responsible for obtaining the information, the material contained in this report is, to the best of my knowledge and belief, accurate and complete.

AEN - Massachusetts
Analysis Report: MA DEP Extractable Petroleum Hydrocarbons
Revision 0 January 1998

Client: IES, Inc.
Project: 797-159 VFW Parkway-W. Roxbury
Report Date: 07/14/98
Collected: 07/06/98
Received: 07/06/98
Extracted: 07/08/98
Analyzed: 07/14/98

AEN ID: I100-901-01
Sample: B-3
Type: Water
Container: Glass
By: BF
Dilution Factor: 1

Number	Parameter	PQL mg/L	Result mg/L
1	C9-C18 Aliphatics	0.1	BQL
2	C19-C36 Aliphatics	0.1	BQL
3	C11-C22 Aromatics	0.1	BQL
4	EPH Concentration (Total):	0.1	BQL
	Compound		
5	Acenaphthene	0.01	BQL
6	Acenaphthylene	0.01	BQL
7	Anthracene	0.01	BQL
8	Benzo(a)anthracene	0.01	BQL
9	Benzo(a)pyrene	0.01	BQL
10	Benzo(b)fluoranthene	0.01	BQL
11	Benzo(g,h,i)perylene	0.01	BQL
12	Benzo(k)fluoranthene	0.01	BQL
13	Chrysene	0.01	BQL
14	Dibenzo(a,h)anthracene	0.01	BQL
15	Fluoranthene	0.01	BQL
16	Fluorene	0.01	BQL
17	Indeno(1,2,3-cd)pyrene	0.01	BQL
18	2-Methylnaphthalene	0.01	BQL
19	Naphthalene	0.01	BQL
20	Phenanthrene	0.01	BQL
21	Pyrene	0.01	BQL

Surrogate Standard Recovery:

Chloro-octadecane (COD) 78 %
Ortho-terphenyl (OTP) 86 %

Fractionation Surrogate Recovery:

2-Bromonaphthalene 58 %
2-Fluorobiphenyl 113 %

Comments:

PQL = Practical quantitation limit.

BQL = Below quantitation limit.

The C11-C22 aromatic region excludes target PAH analytes.

Refer to the VPH/EPH Certification associated with this sample for additional sample and QC information.

The corrective action surrogate recovery limits are 40-140%.

AEN - Massachusetts
Analysis Report: MA DEP Extractable Petroleum Hydrocarbons
Revision 0 January 1998

Client: IES, Inc.
Project: 797-159 VFW Parkway-W. Roxbury
Report Date: 07/14/98
Collected: 07/06/98
Received: 07/06/98
Extracted: 07/08/98
Analyzed: 07/14/98

AEN ID: I100-901-02
Sample: B-4
Type: Water
Container: Glass
By: BF
Dilution Factor: 1

Number	Parameter	PQL mg/L	Result mg/L
1	C9-C18 Aliphatics	0.1	1.3
2	C19-C36 Aliphatics	0.1	6.9
3	C11-C22 Aromatics	0.1	1.6
4	EPH Concentration (Total):	0.1	9.9
	Compound		
5	Acenaphthene	0.01	BQL
6	Acenaphthylene	0.01	BQL
7	Anthracene	0.01	BQL
8	Benzo(a)anthracene	0.01	BQL
9	Benzo(a)pyrene	0.01	BQL
10	Benzo(b)fluoranthene	0.01	BQL
11	Benzo(g,h,i)perylene	0.01	BQL
12	Benzo(k)fluoranthene	0.01	BQL
13	Chrysene	0.01	BQL
14	Dibenzo(a,h)anthracene	0.01	BQL
15	Fluoranthene	0.01	BQL
16	Fluorene	0.01	BQL
17	Indeno(1,2,3-cd)pyrene	0.01	BQL
18	2-Methylnaphthalene	0.01	BQL
19	Naphthalene	0.01	BQL
20	Phenanthrene	0.01	BQL
21	Pyrene	0.01	BQL

Surrogate Standard Recovery:

Chloro-octadecane (COD) 57 %
Ortho-terphenyl (OTP) 86 %

Fractionation Surrogate Recovery:

2-Bromonaphthalene 79 %
2-Fluorobiphenyl 104 %

Comments:

PQL = Practical quantitation limit.

BQL = Below quantitation limit.

The C11-C22 aromatic region excludes target PAH analytes.

Refer to the VPH/EPH Certification associated with this sample for additional sample and QC information.

The corrective action surrogate recovery limits are 40-140%.

AEN - Massachusetts
Analysis Report: MA DEP Extractable Petroleum Hydrocarbons
Revision 0 January 1998

Client:	IES, Inc.	AEN ID:	I100-901-03
Project:	797-159 VFW Parkway-W. Roxbury	Sample:	B-5
Report Date:	07/14/98	Type:	Water
Collected:	07/06/98	Container:	Glass
Received:	07/06/98	By:	BF
Extracted:	07/08/98	Dilution Factor:	1.1
Analyzed:	07/14/98		

Number	Parameter	PQL mg/L	Result mg/L
1	C9-C18 Aliphatics	0.11	BQL
2	C19-C36 Aliphatics	0.11	1.4
3	C11-C22 Aromatics	0.11	BQL
4	EPH Concentration (Total):	0.11	1.4
	Compound		
5	Acenaphthene	0.011	BQL
6	Acenaphthylene	0.011	BQL
7	Anthracene	0.011	BQL
8	Benzo(a)anthracene	0.011	BQL
9	Benzo(a)pyrene	0.011	BQL
10	Benzo(b)fluoranthene	0.011	BQL
11	Benzo(g,h,i)perylene	0.011	BQL
12	Benzo(k)fluoranthene	0.011	BQL
13	Chrysene	0.011	BQL
14	Dibenzo(a,h)anthracene	0.011	BQL
15	Fluoranthene	0.011	BQL
16	Fluorene	0.011	BQL
17	Indeno(1,2,3-cd)pyrene	0.011	BQL
18	2-Methylnaphthalene	0.011	BQL
19	Naphthalene	0.011	BQL
20	Phenanthrene	0.011	BQL
21	Pyrene	0.011	BQL

Surrogate Standard Recovery:

Chloro-octadecane (COD)	72	%
Ortho-terphenyl (OTP)	85	%

Fractionation Surrogate Recovery:

2-Bromonaphthalene	42	%
2-Fluorobiphenyl	94	%

Comments:

PQL = Practical quantitation limit.

BQL = Below quantitation limit.

The C11-C22 aromatic region excludes target PAH analytes.

Refer to the VPH/EPH Certification associated with this sample for additional sample and QC information.

The corrective action surrogate recovery limits are 40-140%.

AEN - Massachusetts
Analysis Report: MA DEP Extractable Petroleum Hydrocarbons
Revision 0 January 1998

Client:	IES, Inc.	AEN ID:	I100-901-04
Project:	797-159 VFW Parkway-W. Roxbury	Sample:	B-6
Report Date:	07/14/98	Type:	Water
Collected:	07/06/98	Container:	Glass
Received:	07/06/98	By:	BF
Extracted:	07/08/98	Dilution Factor:	1.1
Analyzed:	07/14/98		

Number	Parameter	PQL mg/L	Result mg/L
1	C9-C18 Aliphatics	0.11	BQL
2	C19-C36 Aliphatics	0.11	BQL
3	C11-C22 Aromatics	0.11	BQL
4	EPH Concentration (Total):	0.11	BQL
	Compound		
5	Acenaphthene	0.011	BQL
6	Acenaphthylene	0.011	BQL
7	Anthracene	0.011	BQL
8	Benzo(a)anthracene	0.011	BQL
9	Benzo(a)pyrene	0.011	BQL
10	Benzo(b)fluoranthene	0.011	BQL
11	Benzo(g,h,i)perylene	0.011	BQL
12	Benzo(k)fluoranthene	0.011	BQL
13	Chrysene	0.011	BQL
14	Dibenzo(a,h)anthracene	0.011	BQL
15	Fluoranthene	0.011	BQL
16	Fluorene	0.011	BQL
17	Indeno(1,2,3-cd)pyrene	0.011	BQL
18	2-Methylnaphthalene	0.011	BQL
19	Naphthalene	0.011	BQL
20	Phenanthrene	0.011	BQL
21	Pyrene	0.011	BQL

Surrogate Standard Recovery:

Chloro-octadecane (COD)	66	%
Ortho-terphenyl (OTP)	74	%

Fractionation Surrogate Recovery:

2-Bromonaphthalene	67	%
2-Fluorobiphenyl	109	%

Comments:

PQL = Practical quantitation limit.

BQL = Below quantitation limit.

The C11-C22 aromatic region excludes target PAH analytes.

Refer to the VPH/EPH Certification associated with this sample for additional sample and QC information.

The corrective action surrogate recovery limits are 40-140%.

AEN - Massachusetts
Analysis Report: MA DEP Extractable Petroleum Hydrocarbons
Revision 0 January 1998

Client:	IES, Inc.	AEN ID:	1100-901-05
Project:	797-159 VFW Parkway-W. Roxbury	Sample:	Blank
Report Date:	07/14/98	Type:	Water
Collected:	07/06/98	Container:	Glass
Received:	07/06/98	By:	BF
Extracted:	07/08/98	Dilution Factor:	1.1
Analyzed:	07/14/98		

Number	Parameter	PQL mg/L	Result mg/L
1	C9-C18 Aliphatics	0.11	BQL
2	C19-C36 Aliphatics	0.11	BQL
3	C11-C22 Aromatics	0.11	BQL
4	EPH Concentration (Total):	0.11	BQL
	Compound		
5	Acenaphthene	0.011	BQL
6	Acenaphthylene	0.011	BQL
7	Anthracene	0.011	BQL
8	Benzo(a)anthracene	0.011	BQL
9	Benzo(a)pyrene	0.011	BQL
10	Benzo(b)fluoranthene	0.011	BQL
11	Benzo(g,h,i)perylene	0.011	BQL
12	Benzo(k)fluoranthene	0.011	BQL
13	Chrysene	0.011	BQL
14	Dibenzo(a,h)anthracene	0.011	BQL
15	Fluoranthene	0.011	BQL
16	Fluorene	0.011	BQL
17	Indeno(1,2,3-cd)pyrene	0.011	BQL
18	2-Methylnaphthalene	0.011	BQL
19	Naphthalene	0.011	BQL
20	Phenanthrene	0.011	BQL
21	Pyrene	0.011	BQL

Surrogate Standard Recovery:

Chloro-octadecane (COD)	95	%
Ortho-terphenyl (OTP)	101	%

Fractionation Surrogate Recovery:

2-Bromonaphthalene	10	%
2-Fluorobiphenyl	89	%

Comments:

PQL = Practical quantitation limit.

BQL = Below quantitation limit.

The C11-C22 aromatic region excludes target PAH analytes.

Refer to the VPH/EPH Certification associated with this sample for additional sample and QC information.

The corrective action surrogate recovery limits are 40-140%.

AEN - Massachusetts
Analysis Report: MA DEP Volatile Petroleum Hydrocarbons
Revision 0 January 1998

Client: IES, Inc.
Project: 797-159 VFW Parkway-W.Roxbury
Report Date: 07/09/98
Collected: 07/06/98
Received: 07/06/98
Analyzed: 07/08/98

AEN ID: I100-901-01
Sample: B-3
Type: Water
Container: VOA
By: SM
Dilution Factor: 1

Number	Parameter	PQL mg/L	Result mg/L
1	C5-C8 Aliphatics (FID)	0.05	BQL
2	C9-C12 Aliphatics (FID)	0.05	0.077
3	C9-C10 Aromatics (PID)	0.05	BQL
4	VPH Concentration (Total):	0.05	0.077
Compound/Elution Range			
5	Methyl-t-butyl ether (C5-C8)	0.005	BQL
6	Benzene (C5-C8)	0.005	BQL
7	Toluene (C5-C8)	0.005	BQL
8	Ethylbenzene (C9-C12)	0.005	BQL
9	Xylene (Total) (C9-C12)	0.005	BQL
10	Naphthalene	0.01	BQL

Surrogate Standard Recovery:

2,5-Dibromotoluene (FID) 126 %
2,5-Dibromotoluene (PID) 129 %

Comments:

PQL = Practical quantitation limit.

BQL = Below quantitation limit.

The C5-C8 aliphatic region excludes BT and MTBE.

The C9-C12 aliphatic region excludes ethylbenzene, total xylenes and the collective C9-C10 aromatics.

Refer to the VPH/EPH Certification associated with this sample for additional sample and QC information.

The corrective action surrogate recovery limits are 70-130%.

AEN - Massachusetts
Analysis Report: MA DEP Volatile Petroleum Hydrocarbons
Revision 0 January 1998

Client: IES, Inc.
Project: 797-159 VFW Parkway-W.Roxbury
Report Date: 07/09/98
Collected: 07/06/98
Received: 07/06/98
Analyzed: 07/08/98

AEN ID: I100-901-02
Sample: B-4
Type: Water
Container: VOA
By: SM
Dilution Factor: 1.7

Number	Parameter	PQL mg/L	Result mg/L
1	C5-C8 Aliphatics (FID)	0.085	BQL
2	C9-C12 Aliphatics (FID)	0.085	0.32
3	C9-C10 Aromatics (PID)	0.085	0.30
4	VPH Concentration (Total):	0.085	0.62
Compound/Elution Range			
5	Methyl-t-butyl ether (C5-C8)	0.0085	BQL
6	Benzene (C5-C8)	0.0085	BQL
7	Toluene (C5-C8)	0.0085	BQL
8	Ethylbenzene (C9-C12)	0.0085	BQL
9	Xylene (Total) (C9-C12)	0.0085	BQL
10	Naphthalene	0.017	BQL

Surrogate Standard Recovery:

2,5-Dibromotoluene (FID) 115 %
2,5-Dibromotoluene (PID) 118 %

Comments:

PQL = Practical quantitation limit.

BQL = Below quantitation limit.

The C5-C8 aliphatic region excludes BT and MTBE.

The C9-C12 aliphatic region excludes ethylbenzene, total xylenes and the collective C9-C10 aromatics.

Refer to the VPH/EPH Certification associated with this sample for additional sample and QC information.

The corrective action surrogate recovery limits are 70-130%.

AEN - Massachusetts
Analysis Report: MA DEP Volatile Petroleum Hydrocarbons
Revision 0 January 1998

Client:	IES, Inc.	AEN ID:	1100-901-03
Project:	797-159 VFW Parkway-W.Roxbury	Sample:	B-5
Report Date:	07/09/98	Type:	Water
Collected:	07/06/98	Container:	VOA
Received:	07/06/98	By:	SM
Analyzed:	07/08/98	Dilution Factor:	1

Number	Parameter	PQL mg/L	Result mg/L
1	C5-C8 Aliphatics (FID)	0.05	BQL
2	C9-C12 Aliphatics (FID)	0.05	0.17
3	C9-C10 Aromatics (PID)	0.05	0.068
4	VPH Concentration (Total):	0.05	2.4
Compound/Elution Range			
5	Methyl-t-butyl ether (C5-C8)	0.005	BQL
6	Benzene (C5-C8)	0.005	BQL
7	Toluene (C5-C8)	0.005	BQL
8	Ethylbenzene (C9-C12)	0.005	BQL
9	Xylene (Total) (C9-C12)	0.005	BQL
10	Naphthalene	0.01	BQL

Surrogate Standard Recovery:

2,5-Dibromotoluene (FID)	130	%
2,5-Dibromotoluene (PID)	130	%

Comments:

PQL = Practical quantitation limit.

BQL = Below quantitation limit.

The C5-C8 aliphatic region excludes BT and MTBE.

The C9-C12 aliphatic region excludes ethylbenzene, total xylenes and the collective C9-C10 aromatics.

Refer to the VPH/EPH Certification associated with this sample for additional sample and QC information.

The corrective action surrogate recovery limits are 70-130%.

AEN - Massachusetts
Analysis Report: MA DEP Volatile Petroleum Hydrocarbons
Revision 0 January 1998

Client:	IES, Inc.	AEN ID:	I100-901-04
Project:	797-159 VFW Parkway-W.Roxbury	Sample:	B-6
Report Date:	07/09/98	Type:	Water
Collected:	07/06/98	Container:	VOA
Received:	07/06/98	By:	SM
Analyzed:	07/08/98	Dilution Factor:	1

Number	Parameter	PQL mg/L	Result mg/L
1	C5-C8 Aliphatics (FID)	0.05	BQL 0.12 0.093
2	C9-C12 Aliphatics (FID)	0.05	
3	C9-C10 Aromatics (PID)	0.05	
4	VPH Concentration (Total):	0.05	0.22
Compound/Elution Range			
5	Methyl-t-butyl ether (C5-C8)	0.005	BQL
6	Benzene (C5-C8)	0.005	BQL
7	Toluene (C5-C8)	0.005	BQL
8	Ethylbenzene (C9-C12)	0.005	BQL
9	Xylene (Total) (C9-C12)	0.005	BQL
10	Naphthalene	0.01	BQL

Surrogate Standard Recovery:

2,5-Dibromotoluene (FID)	113	%
2,5-Dibromotoluene (PID)	115	%

Comments:

PQL = Practical quantitation limit.

BQL = Below quantitation limit.

The C5-C8 aliphatic region excludes BT and MTBE.

The C9-C12 aliphatic region excludes ethylbenzene, total xylenes and the collective C9-C10 aromatics.

Refer to the VPH/EPH Certification associated with this sample for additional sample and QC information.

The corrective action surrogate recovery limits are 70-130%.

AEN - Massachusetts
Analysis Report: MA DEP Volatile Petroleum Hydrocarbons
Revision 0 January 1998

Client:	IBS, Inc.	AEN ID:	I100-901-05
Project:	797-159 VFW Parkway-W.Roxbury	Sample:	Blank
Report Date:	07/09/98	Type:	Water
Collected:	07/06/98	Container:	VOA
Received:	07/06/98	By:	SM
Analyzed:	07/09/98	Dilution Factor:	1

Number	Parameter	PQL mg/L	Result mg/L
1	C5-C8 Aliphatics (FID)	0.05	BQL
2	C9-C12 Aliphatics (FID)	0.05	BQL
3	C9-C10 Aromatics (PID)	0.05	BQL
4	VPH Concentration (Total):	0.05	BQL
Compound/Elution Range			
5	Methyl-t-butyl ether (C5-C8)	0.005	BQL
6	Benzene (C5-C8)	0.005	BQL
7	Toluene (C5-C8)	0.005	BQL
8	Ethylbenzene (C9-C12)	0.005	BQL
9	Xylene (Total) (C9-C12)	0.005	BQL
10	Naphthalene	0.01	BQL

Surrogate Standard Recovery:

2,5-Dibromotoluene (FID)	130	%
2,5-Dibromotoluene (PID)	129	%

Comments:

PQL = Practical quantitation limit.

BQL = Below quantitation limit.

The C5-C8 aliphatic region excludes BT and MTBE.

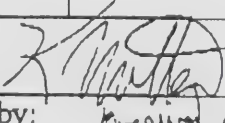
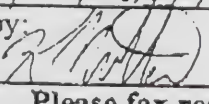
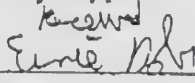
The C9-C12 aliphatic region excludes ethylbenzene, total xylenes and the collective C9-C10 aromatics.

Refer to the VPH/EPH Certification associated with this sample for additional sample and QC information.

The corrective action surrogate recovery limits are 70-130%.

I100-901

CHAIN OF CUSTODY RECORD

Laboratory: AEN						
Project Name: VFW Parkway - W. Roxbury				Project Number: 797-159		
Sampler: Kerry Aschta				IES Staff: Daniel Jaffe		
Sample Identification	Date	Time	Sample Type		Number of Containers	Analysis Requested
			Water	Soil		
B-3 7/6 ~~6/15~~	AM	X			2	EPH
B-4 7/6 ~~6/15~~	AM	X			2	EPH
B-5 7/6 ~~6/15~~	AM	X			2	EPH
B-6 7/6 ~~6/15~~	AM	X			2	EPH
Blank 7/6 ~~6/15~~	AM	X			1	EPH
B-3 7/6 ~~6/15~~	AM	X			2	VPH
B-4 7/6 ~~6/15~~	AM	X			2	VPH
B-5 7/6 ~~6/15~~	AM	X			2	VPH
B-6 7/6 ~~6/15~~	AM	X			2	VPH
Blank 7/6 ~~6/15~~	AM	X			1	VPH
Relinquished by: (Signature) A. Bokor			Received by: 			Date/Time
Relinquished by: (Signature) 			Relinquished by: (Signature) 			Date/Time 7.6.98, 6:20
Comment: Please fax results to (617) 629-2920						



Severn Trent Laboratories
149 Rangeway Road
North Billerica MA 01862

Tel: (978) 667-1400
Fax: (978) 667-7871

Mr. Daniel Jaffe
IES, Inc.
265 Medford Street
Suite 312
Somerville, MA 02143

October 20, 1998

Dear Mr. Jaffe:

Please find enclosed the analytical results of the sample(s) received at our laboratory on October 09, 1998. This report contains sections addressing the following information at a minimum:

- sample ID correspondence table
- chain-of-custody (if applicable)
- analytical results
- definitions of data qualifiers and terminology

Client Project #	797-159	Client Project Name	VFW Parkway, W. Roxbury
STL Report #	I100-936	Purchase Order #	N/A

Copies of this analytical report and supporting data are maintained in our files for a minimum of 3 years unless special arrangements are made. Unless specifically indicated, all analytical testing was performed at the Billerica, Massachusetts STL laboratory.

We appreciate your selection of our services and welcome any questions or suggestions you may have relative to this report. Please contact your customer service representative at (978) 667-1400 for any additional information. Thank you for utilizing our services and we hope you will consider us for your future analytical needs.

I have reviewed and approved the enclosed data for final release.

Sincerely,

Michael F. Wheeler, Ph.D.
Laboratory Director

Severn Trent Laboratories
MA-DEP #MA038

MW/dib

h:\reports\forms\dconwin\rfp00101.ma

10/20/98, 9:28 am

Other Laboratory Locations:

- 16203 Park Row, Suite 110, Houston TX 77084
- 200 Monroe Turnpike, Monroe CT 06468
- 120 Southcenter Court, Suite 300, Morrisville NC 27560

- 315 Fullerton Avenue, Newburgh NY 12550
- 11 East Olive Road, Pensacola FL 32514
- Westfield Executive Park, 53 Southampton Road, Westfield MA 01085
- 628 Route 10, Whippany NJ 07981

a part of
Severn Trent Services Inc.

Definitions of Data Qualifiers and Terminology

A number of data qualifiers are widely used within the environmental testing industry and may be utilized in our data reports. The following definitions of these qualifiers are included as a service to our clientele. The majority of the qualifiers have evolved from the EPA contract laboratory program (CLP).

General

- BQL -** Below Quantitation Limit indicates the compound was not detected in the sample above the practical quantitation limit.
- MDL -** The method detection limit is defined as the minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero.
- NA -** Not applicable or not available.
- ND -** Indicates the compound or analyte was not detected in the sample above the method detection limit or the practical quantitation limit for the particular analysis.
- PQL -** The practical quantitation limit is the lowest level that can be reliably achieved within specified limits of precision and accuracy during routine operating conditions.

Organic

- B -** This flag is used when the analyte is found in the associated blank as well as in the sample. It indicates possible/probable blank contamination and warns the data user to use caution when applying the results of this analyte.
- D -** Indicates the compound was diluted below the calibration range.
- E -** Indicates that the concentration of the specific compound exceeded the calibration range of the instrument for that particular analysis.
- J -** Indicates an estimated value. The compound is determined to be present in the sample based on GC/MS criteria, but the amount is less than the sample quantitation limit. STL-MA GC/MS reports do not typically report J - marked results. If requested, J - marked results are provided and the report flagged to verify that the data was appropriately reviewed.

Inorganic

- U-** Indicates that the analyte was analyzed for but not detected.
- B-** The reported value is less than the Contract Required Detection Limit (CRDL), but greater than the Instrument Detection Limit (IDL).
- E-** Indicates an estimated value because of the presence of interference.

Sample ID Correspondence Table

Client Sample ID	STL Sample ID
North	I100-936-01
West	I100-936-02
South	I100-936-03

STL - Massachusetts
Analysis Report: MA DEP Extractable Petroleum Hydrocarbons
Revision 0 January 1998

Client: IES, Inc.	STL ID: I100-936-01
Project: 797-159 VFW Parkway, W. Roxbury	Sample: North
Report Date: 10/20/98	Type: Soil
Collected: 10/08/98	Container: Glass
Received: 10/09/98	By: LSB
Extracted: 10/12/98	Dilution Factor: 1.2
Analyzed: 10/16/98	

Number	Parameter	PQL mg/kg (dry)	Result mg/kg (dry)
1	C9-C18 Aliphatics	3.84	BQL
2	C19-C36 Aliphatics	3.84	50
3	C11-C22 Aromatics	3.84	74
4	EPH Concentration (Total):	3.84	120
Compound			
5	Acenaphthene	0.396	BQL
6	Acenaphthylene	0.396	BQL
7	Anthracene	0.396	0.46
8	Benzo(a)anthracene	0.396	3.2
9	Benzo(a)pyrene	0.396	3.1
10	Benzo(b)fluoranthene	0.396	2.0
11	Benzo(g,h,i)perylene	0.396	2.0
12	Benzo(k)fluoranthene	0.396	2.2
13	Chrysene	0.396	3.2
14	Dibenzo(a,h)anthracene	0.396	BQL
15	Fluoranthene	0.396	5.1
16	Fluorene	0.396	BQL
17	Indeno(1,2,3-cd)pyrene	0.396	1.7
18	2-Methylnaphthalene	0.396	BQL
19	Naphthalene	0.396	BQL
20	Phenanthrene	0.396	1.4
21	Pyrene	0.396	3.4

Surrogate Standard Recovery:

Chloro-octadecane (COD)	100	%
Ortho-terphenyl (OTP)	117	%

Fractionation Surrogate Recovery:

2-Bromonaphthalene	97	%
2-Fluorobiphenyl	94	%

Comments:

PQL = Practical quantitation limit.

BQL = Below quantitation limit.

The C11-C22 aromatic region excludes target PAH analytes.

Refer to the VPH/EPH Certification associated with this sample for additional sample and QC information.

The corrective action surrogate recovery limits are 40-140%.

STL - Massachusetts
Analysis Report: MA DEP Extractable Petroleum Hydrocarbons
Revision 0 January 1998

Client: IES, Inc.	STL ID: I100-936-02
Project: 797-159 VFW Parkway, W. Roxbury	Sample: West
Report Date: 10/20/98	Type: Soil
Collected: 10/08/98	Container: Glass
Received: 10/09/98	By: LSB
Extracted: 10/12/98	Dilution Factor: 1.2
Analyzed: 10/16/98	

Number	Parameter	PQL mg/kg (dry)	Result mg/kg (dry)
1	C9-C18 Aliphatics	3.84	BQL
2	C19-C36 Aliphatics	3.84	54
3	C11-C22 Aromatics	3.84	57
4	EPH Concentration (Total):	3.84	110
Compound			
5	Acenaphthene	0.396	BQL
6	Acenaphthylene	0.396	BQL
7	Anthracene	0.396	BQL
8	Benzo(a)anthracene	0.396	1.2
9	Benzo(a)pyrene	0.396	1.6
10	Benzo(b)fluoranthene	0.396	0.45
11	Benzo(g,h,i)perylene	0.396	1.2
12	Benzo(k)fluoranthene	0.396	BQL
13	Chrysene	0.396	1.5
14	Dibenzo(a,h)anthracene	0.396	BQL
15	Fluoranthene	0.396	1.4
16	Fluorene	0.396	BQL
17	Indeno(1,2,3-cd)pyrene	0.396	BQL
18	2-Methylnaphthalene	0.396	BQL
19	Naphthalene	0.396	BQL
20	Phenanthrene	0.396	0.73
21	Pyrene	0.396	1.3

Surrogate Standard Recovery:

Chloro-octadecane (COD)	89	%
Ortho-terphenyl (OTP)	100	%

Fractionation Surrogate Recovery:

2-Bromonaphthalene	92	%
2-Fluorobiphenyl	86	%

Comments:

PQL = Practical quantitation limit.

BQL = Below quantitation limit.

The C11-C22 aromatic region excludes target PAH analytes.

Refer to the VPH/EPH Certification associated with this sample for additional sample and QC information.

The corrective action surrogate recovery limits are 40-140%.

STL - Massachusetts
Analysis Report: MA DEP Extractable Petroleum Hydrocarbons
Revision 0 January 1998

Client: IES, Inc.	STL ID: I100-936-03
Project: 797-159 VFW Parkway, W. Roxbury	Sample: South
Report Date: 10/20/98	Type: Soil
Collected: 10/08/98	Container: Glass
Received: 10/09/98	By: LSB
Extracted: 10/12/98	Dilution Factor: 1.1
Analyzed: 10/16/98	

Number	Parameter	PQL mg/kg (dry)	Result mg/kg (dry)
1	C9-C18 Aliphatics	3.52	BQL
2	C19-C36 Aliphatics	3.52	BQL
3	C11-C22 Aromatics	3.52	BQL
4	EPH Concentration (Total):	3.52	BQL
	Compound		
5	Acenaphthene	0.363	BQL
6	Acenaphthylene	0.363	BQL
7	Anthracene	0.363	BQL
8	Benzo(a)anthracene	0.363	BQL
9	Benzo(a)pyrene	0.363	BQL
10	Benzo(b)fluoranthene	0.363	BQL
11	Benzo(g,h,i)perylene	0.363	BQL
12	Benzo(k)fluoranthene	0.363	BQL
13	Chrysene	0.363	BQL
14	Dibenzo(a,h)anthracene	0.363	BQL
15	Fluoranthene	0.363	BQL
16	Fluorene	0.363	BQL
17	Indeno(1,2,3-cd)pyrene	0.363	BQL
18	2-Methylnaphthalene	0.363	BQL
19	Naphthalene	0.363	BQL
20	Phenanthrene	0.363	0.45
21	Pyrene	0.363	BQL

Surrogate Standard Recovery:

Chloro-octadecane (COD)	106	%
Ortho-terphenyl (OTP)	116	%

Fractionation Surrogate Recovery:

2-Bromonaphthalene	87	%
2-Fluorobiphenyl	87	%

Comments:

PQL = Practical quantitation limit.

BQL = Below quantitation limit.

The C11-C22 aromatic region excludes target PAH analytes.

Refer to the VPH/EPH Certification associated with this sample for additional sample and QC information.

The corrective action surrogate recovery limits are 40-140%.

VPH/EPH CERTIFICATION

The samples in this data set were analyzed by the MADEP VPH and/or EPH Methods (Revision 0 January 1998). The following information is provided relative to sample receipt, QA/QC procedures and method modifications.

Sample Receipt:

- Sample containers were received in satisfactory condition.
- Samples were received at ambient temperature.
- Aqueous samples were preserved properly.
- VPH soil samples were properly preserved with methanol (1:1 $\pm$ 25%; covered soil).

QA/QC Procedures:

- All QA/QC procedures required by the EPH/VPH Methods were followed.
- All method performance/acceptance standards for required QA/QC procedures were achieved. The method specified surrogate standard recovery ranges are 40%-140% (EPH) and 70%-130% (VPH).

Method Modifications:

- No significant modifications were made to the EPH or VPH Methods.

Certification:

The signature on the report cover page serves as the attestation for the method specified certification:

I attest under the pains of perjury that, based upon my inquiry of those individuals immediately responsible for obtaining the information, the material contained in this report is, to the best of my knowledge and belief, accurate and complete.

CHAIN OF CUSTODY RECORD

[illegible]

Received by Smith
10/07/98 11:45

Technical Report for

IES, Inc.

VFW Pkwy. West. Roxbury

797-159

Accutest Job Number: M6277

Report to:

IES, Inc.
265 Medford St.
Sommerville, MA 02143

ATTN: Danneil Jaffe

Total number of pages in report: 5



Reza Tand
Lab Director

Certifications: MA (MA136) CT (PH-0109) NH (250293) NJ (59928) RI (A-71) ME (MA136)

Results relate only to the items tested.

This report shall not be reproduced, except in its entirety, without the written approval of Accutest Laboratories.

Sample Summary

IES, Inc.

Date: 12/01/98

VFW Pkwy. West. Roxbury

Job No: M6277

Project No: 797-159

Sample Number	Collected Date	Time By	Received	Matrix Code Type	Client Sample ID
M6277-1	11/24/98	00:00 KA	11/24/98	AQ Ground Water	B-1
M6277-2	11/24/98	00:00 KA	11/24/98	AQ Ground Water	BLANK

**Report of Analysis**

Client Sample ID:	B-1	Date Sampled:	11/24/98
Lab Sample ID:	M6277-1	Date Received:	11/24/98
Matrix:	AQ - Ground Water	Percent Solids:	n/a
Method:	MADEP VPH		
Project:	VFW Pkwy. West. Roxbury		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GE14388.D	1	11/29/98	AF	n/a	n/a	GCE468
Run #2							

MA-VPH List

CAS No.	Compound	Result	RDL	Units	Q
	C5- C8 Aliphatics	207	100	ug/l	
	C9- C12 Aliphatics	ND	100	ug/l	
	C9- C10 Aromatics	ND	100	ug/l	
71-43-2	Benzene	ND	5.0	ug/l	
100-41-4	Ethylbenzene	ND	5.0	ug/l	
1634-04-4	Methyl Tert Butyl Ether	72.4	5.0	ug/l	
91-20-3	Naphthalene	ND	5.0	ug/l	
108-88-3	Toluene	ND	5.0	ug/l	
	m,p-Xylene	ND	5.0	ug/l	
95-47-6	o-Xylene	ND	5.0	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
615-59-8	2,5-Dibromotoluene	91 %		70-130 %
615-59-8	2,5-Dibromotoluene	96 %		70-130 %

ND = Not detected

RDL = Reported Detection Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

Report of Analysis

Page 1 of 1

Client Sample ID:	BLANK		
Lab Sample ID:	M6277-2	Date Sampled:	11/24/98
Matrix:	AQ - Ground Water	Date Received:	11/24/98
Method:	MADEP VPH	Percent Solids:	n/a
Project:	VFW Pkwy. West. Roxbury		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GE14378.D	1	11/28/98	AF	n/a	n/a	GCE468
Run #2							

MA-VPH List

CAS No.	Compound	Result	RDL	Units	Q
	C5- C8 Aliphatics	ND	100	ug/l	
	C9- C12 Aliphatics	ND	100	ug/l	
	C9- C10 Aromatics	ND	100	ug/l	
71-43-2	Benzene	ND	5.0	ug/l	
100-41-4	Ethylbenzene	ND	5.0	ug/l	
1634-04-4	Methyl Tert Butyl Ether	ND	5.0	ug/l	
91-20-3	Naphthalene	ND	5.0	ug/l	
108-88-3	Toluene	ND	5.0	ug/l	
	m,p-Xylene	ND	5.0	ug/l	
95-47-6	o-Xylene	ND	5.0	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
615-59-8	2,5-Dibromotoluene	78%		70-130%
615-59-8	2,5-Dibromotoluene	75%		70-130%

ND = Not detected

RDL = Reported Detection Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

M6277
~~(M6276-5)~~
707

lot. 206

Technical Report for

IES, Inc.

VFW Pkwy. West. Roxbury

797-159

Accutest Job Number: M6278

Report to:

IES, Inc.
265 Medford St.
Sommerville, MA 02143

ATTN: Danneil Jaffe

Total number of pages in report: 6



Reza Tand
Lab Director

Certifications: MA (MA136) CT (PH-0109) NH (250293) NJ (59928) RI (A-71) ME (MA136)

Results relate only to the items tested.

This report shall not be reproduced, except in its entirety, without the written approval of Accutest Laboratories.

Sample Summary

IES, Inc.

Date: 12/01/98

VFW Pkwy. West. Roxbury

Job No: M6278

Project No: 797-159

Sample Number	Collected Date	Time By	Received	Matrix Code Type	Client Sample ID
M6278-1	11/16/98	00:00 KA	11/24/98	SO Soil	S-1
M6278-2	11/16/98	00:00 KA	11/24/98	SO Soil	S-2
M6278-3	11/15/98	00:00 KA	11/24/98	SO Soil	S-3

Report of Analysis

Page 1 of 1

Client Sample ID:	S-1	Date Sampled:	11/16/98
Lab Sample ID:	M6278-1	Date Received:	11/24/98
Matrix:	SO - Soil	Percent Solids:	91.3
Project:	VFW Pkwy. West. Roxbury		

General Chemistry

Analyte	Result	RDL	Units	DF	Analyzed By	Method
Petroleum Hydrocarbons	926	180	mg/kg	5	12/01/98 SG	EPA 418.1 M
Solids, Percent	91.3		%	1	11/25/98 SG	EPA 160.3 M

RDL = Reported Detection Limit

**ACCUTEST**

Report of Analysis

Page 1 of 1

Client Sample ID: S-2	
Lab Sample ID: M6278-2	Date Sampled: 11/16/98
Matrix: SO - Soil	Date Received: 11/24/98
	Percent Solids: 86.3
Project: VFW Pkwy. West. Roxbury	

General Chemistry

Analyte	Result	RDL	Units	DF	Analyzed By	Method
Petroleum Hydrocarbons	1260	200	mg/kg	5	12/01/98 SG	EPA 418.1 M
Solids, Percent	86.3		%	1	11/25/98 SG	EPA 160.3 M

RDL = Reported Detection Limit

Report of Analysis

Page 1 of 1

Client Sample ID:	S-3	Date Sampled:	11/15/98
Lab Sample ID:	M6278-3	Date Received:	11/24/98
Matrix:	SO - Soil	Percent Solids:	84.9
Project:	VFW Pkwy. West. Roxbury		

General Chemistry

Analyte	Result	RDL	Units	DF	Analyzed By	Method
Petroleum Hydrocarbons	6370	990	mg/kg	25	12/01/98 SG	EPA 418.1 M
Solids, Percent	84.9		%	1	11/25/98 SG	EPA 160.3 M

RDL = Reported Detection Limit

M6278

loc 2B

Technical Report for

IES, Inc.

VFW Pkwy. West. Roxbury

797-159

Accutest Job Number: M6447

Report to:

IES, Inc.
265 Medford St.
Sommerville, MA 02143

ATTN: Danneil Jaffe

Total number of pages in report: 17



Reza Tand
Lab Director

Certifications: MA (MA136) CT (PH-0109) NH (250293) NJ (59928) RI (A-71) ME (MA136)

Results relate only to the items tested.

This report shall not be reproduced, except in its entirety, without the written approval of Accutest Laboratories.

Sample Summary

IES, Inc.

VFW Pkwy. West. Roxbury
Project No: 797-159

Date: 01/05/99
Job No: M6447

Sample Number	Collected Date	Time By	Received	Matrix Code	Type	Client Sample ID
M6447-1	12/10/98	10:00 DJ	12/14/98	SO	Soil	B-7/8-12'
M6447-2	12/10/98	10:30 DJ	12/14/98	SO	Soil	B-8/8-12'
M6447-3	12/10/98	11:30 DJ	12/14/98	SO	Soil	B-9/8-10'
M6447-4	12/10/98	12:30 DJ	12/14/98	SO	Soil	B-10/8-12'
M6447-5	12/10/98	13:00 DJ	12/14/98	SO	Soil	B-11/8-12'
M6447-6	12/10/98	13:30 DJ	12/14/98	SO	Soil	B-7/8-12'
M6447-7	12/10/98	14:00 DJ	12/14/98	SO	Soil	B-8/8-12'
M6447-8	12/10/98	15:30 DJ	12/14/98	SO	Soil	B-10/8-12'
M6447-9	12/10/98	17:00 DJ	12/14/98	SO	Soil	B-11/8-12'

Report of Analysis

Page 1 of 1

Client Sample ID: B-7/8-12'	
Lab Sample ID: M6447-1	Date Sampled: 12/10/98
Matrix: SO - Soil	Date Received: 12/14/98
Method: MADEP EPH	Percent Solids: 88.3
Project: VFW Pkwy. West. Roxbury	

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GCH0557.D	1	12/29/98	TLQ	12/17/98	OP951	GCH29
Run #2	GCH0556.D	1	12/29/98	TLQ	12/17/98	OP951	GCH30

ABN Special List

CAS No.	Compound	Result	RDL	Units	Q
	C9-C18 Aliphatics	76300	6500	ug/kg	
	C19-C36 Aliphatics	2730000	8600	ug/kg	
	C11-C22 Aromatics	ND ^a	18000	ug/kg	
	C11-C22 Aromatics (Unadj.)	ND ^a	18000	ug/kg	
83-32-9	Acenaphthene	ND ^a	540	ug/kg	
208-96-8	Acenaphthylene	ND ^a	540	ug/kg	
120-12-7	Anthracene	ND ^a	540	ug/kg	
56-55-3	Benzo (a) anthracene	ND ^a	540	ug/kg	
50-32-8	Benzo (a) pyrene	ND ^a	540	ug/kg	
205-99-2	Benzo (b) fluoranthene	ND ^a	540	ug/kg	
191-24-2	Benzo (g,h,i) perylene	ND ^a	540	ug/kg	
207-08-9	Benzo (k) fluoranthene	ND ^a	540	ug/kg	
218-01-9	Chrysene	ND ^a	540	ug/kg	
53-70-3	Dibenz(a,h)anthracene	ND ^a	540	ug/kg	
206-44-0	Fluoranthene	ND ^a	540	ug/kg	
86-73-7	Fluorene	ND ^a	540	ug/kg	
193-39-5	Indeno (1,2,3-cd) pyrene	ND ^a	540	ug/kg	
91-57-6	2-Methylnaphthalene	ND ^a	540	ug/kg	
91-20-3	Naphthalene	ND ^a	540	ug/kg	
85-01-8	Phenanthrene	ND ^a	540	ug/kg	
129-00-0	Pyrene	ND ^a	540	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl		81%	40-140%
321-60-8	2-Fluorobiphenyl		67%	40-140%
580-13-2	2-Bromonaphthalene		46%	40-140%
3386-33-2	1-Chlorooctadecane	90%		40-140%

(a) Result is from Run# 2

ND = Not detected

RDL = Reported Detection Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

Report of Analysis

Page 1 of 1

Client Sample ID:	B-8/8-12'	Date Sampled:	12/10/98
Lab Sample ID:	M6447-2	Date Received:	12/14/98
Matrix:	SO - Soil	Percent Solids:	87.1
Method:	MADEP EPH		
Project:	VFW Pkwy. West. Roxbury		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GCH0559.D	1	12/29/98	TLQ	12/17/98	OP951	GCH29
Run #2	GCH0558.D	1	12/29/98	TLQ	12/17/98	OP951	GCH30

ABN Special List

CAS No.	Compound	Result	RDL	Units	Q
	C9-C18 Aliphatics	ND	6300	ug/kg	
	C19-C36 Aliphatics	19100	8400	ug/kg	
	C11-C22 Aromatics	243000 ^a	18000	ug/kg	
	C11-C22 Aromatics (Unadj.)	245000 ^a	18000	ug/kg	
83-32-9	Acenaphthene	ND ^a	520	ug/kg	
208-96-8	Acenaphthylene	ND ^a	520	ug/kg	
120-12-7	Anthracene	ND ^a	520	ug/kg	
56-55-3	Benzo (a) anthracene	ND ^a	520	ug/kg	
50-32-8	Benzo (a) pyrene	ND ^a	520	ug/kg	
205-99-2	Benzo (b) fluoranthene	ND ^a	520	ug/kg	
191-24-2	Benzo (g,h,i) perylene	ND ^a	520	ug/kg	
207-08-9	Benzo (k) fluoranthene	ND ^a	520	ug/kg	
218-01-9	Chrysene	ND ^a	520	ug/kg	
53-70-3	Dibenz(a,h)anthracene	ND ^a	520	ug/kg	
206-44-0	Fluoranthene	ND ^a	520	ug/kg	
86-73-7	Fluorene	ND ^a	520	ug/kg	
193-39-5	Indeno (1,2,3-cd) pyrene	ND ^a	520	ug/kg	
91-57-6	2-Methylnaphthalene	764 ^a	520	ug/kg	
91-20-3	Naphthalene	566 ^a	520	ug/kg	
85-01-8	Phenanthrene	ND ^a	520	ug/kg	
129-00-0	Pyrene	900 ^a	520	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl		81%	40-140%
321-60-8	2-Fluorobiphenyl		62%	40-140%
580-13-2	2-Bromonaphthalene		54%	40-140%
3386-33-2	1-Chlorooctadecane	86%		40-140%

(a) Result is from Run# 2

ND = Not detected

RDL = Reported Detection Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

**Report of Analysis**

Client Sample ID:	B-9/8-10'	Date Sampled:	12/10/98
Lab Sample ID:	M6447-3	Date Received:	12/14/98
Matrix:	SO - Soil	Percent Solids:	88.2
Method:	MADEP EPH		
Project:	VFW Pkwy. West. Roxbury		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GCH0561.D	1	12/29/98	TLQ	12/17/98	OP951	GCH29
Run #2	GCH0560.D	1	12/29/98	TLQ	12/17/98	OP951	GCH30

ABN Special List

CAS No.	Compound	Result	RDL	Units	Q
	C9-C18 Aliphatics	57300	6600	ug/kg	
	C19-C36 Aliphatics	1800000	8800	ug/kg	
	C11-C22 Aromatics	764000 a	19000	ug/kg	
	C11-C22 Aromatics (Unadj.)	774000 a	19000	ug/kg	
83-32-9	Acenaphthene	651 a	550	ug/kg	
208-96-8	Acenaphthylene	ND a	550	ug/kg	
120-12-7	Anthracene	ND a	550	ug/kg	
56-55-3	Benzo (a) anthracene	ND a	550	ug/kg	
50-32-8	Benzo (a) pyrene	ND a	550	ug/kg	
205-99-2	Benzo (b) fluoranthene	ND a	550	ug/kg	
191-24-2	Benzo (g,h,i) perylene	ND a	550	ug/kg	
207-08-9	Benzo (k) fluoranthene	ND a	550	ug/kg	
218-01-9	Chrysene	ND a	550	ug/kg	
53-70-3	Dibenz(a,h)anthracene	ND a	550	ug/kg	
206-44-0	Fluoranthene	639 a	550	ug/kg	
86-73-7	Fluorene	ND a	550	ug/kg	
193-39-5	Indeno (1,2,3-cd) pyrene	ND a	550	ug/kg	
91-57-6	2-Methylnaphthalene	3560 a	550	ug/kg	
91-20-3	Naphthalene	3180 a	550	ug/kg	
85-01-8	Phenanthrene	1030 a	550	ug/kg	
129-00-0	Pyrene	1430 a	550	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl		82%	40-140%
321-60-8	2-Fluorobiphenyl		61%	40-140%
580-13-2	2-Bromonaphthalene		56%	40-140%
3386-33-2	1-Chlorooctadecane	74%		40-140%

(a) Result is from Run# 2

ND = Not detected

RDL = Reported Detection Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

Report of Analysis

Page 1 of 1

Client Sample ID: B-9/8-10' Lab Sample ID: M6447-3 Matrix: SO - Soil Method: MADEP VPH Project: VFW Pkwy. West. Roxbury	Date Sampled: 12/10/98 Date Received: 12/14/98 Percent Solids: 88.2
--	--

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GE14773.D	1	12/16/98	AF	n/a	n/a	GCE486
Run #2							

MA-VPH List

CAS No.	Compound	Result	RDL	Units	Q
	C5- C8 Aliphatics	21300	3900	ug/kg	
	C9- C12 Aliphatics	5680	3900	ug/kg	
	C9- C10 Aromatics	35800	3900	ug/kg	
	C5- C8 Aliphatics (Unadj.)	26300	3900	ug/kg	
	C9- C12 Aliphatics (Unadj.)	41500	3900	ug/kg	
71-43-2	Benzene	ND	200	ug/kg	
100-41-4	Ethylbenzene	696	200	ug/kg	
1634-04-4	Methyl Tert Butyl Ether	ND	200	ug/kg	
91-20-3	Naphthalene	1260	200	ug/kg	
108-88-3	Toluene	367	200	ug/kg	
	m,p-Xylene	3590	200	ug/kg	
95-47-6	o-Xylene	413	200	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
615-59-8	2,5-Dibromotoluene	103%		70-130%
615-59-8	2,5-Dibromotoluene	116%		70-130%

ND = Not detected

RDL = Reported Detection Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

Report of Analysis

Page 1 of 1

Client Sample ID: B-10/8-12'	
Lab Sample ID: M6447-4	Date Sampled: 12/10/98
Matrix: SO - Soil	Date Received: 12/14/98
Method: MADEP EPH	Percent Solids: 92.6
Project: VFW Pkwy. West. Roxbury	

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GCH0563.D	1	12/29/98	TLQ	12/17/98	OP951	GCH29
Run #2	GCH0562.D	1	12/29/98	TLQ	12/17/98	OP951	GCH30

ABN Special List

CAS No.	Compound	Result	RDL	Units	Q
	C9-C18 Aliphatics	83200	6300	ug/kg	
	C19-C36 Aliphatics	2810000	8400	ug/kg	
	C11-C22 Aromatics	141000 a	18000	ug/kg	
	C11-C22 Aromatics (Unadj.)	141000 a	18000	ug/kg	
83-32-9	Acenaphthene	ND a	530	ug/kg	
208-96-8	Acenaphthylene	ND a	530	ug/kg	
120-12-7	Anthracene	ND a	530	ug/kg	
56-55-3	Benzo (a) anthracene	ND a	530	ug/kg	
50-32-8	Benzo (a) pyrene	ND a	530	ug/kg	
205-99-2	Benzo (b) fluoranthene	ND a	530	ug/kg	
191-24-2	Benzo (g,h,i) perylene	ND a	530	ug/kg	
207-08-9	Benzo (k) fluoranthene	ND a	530	ug/kg	
218-01-9	Chrysene	ND a	530	ug/kg	
53-70-3	Dibenz(a,h)anthracene	ND a	530	ug/kg	
206-44-0	Fluoranthene	ND a	530	ug/kg	
86-73-7	Fluorene	ND a	530	ug/kg	
193-39-5	Indeno (1,2,3-cd) pyrene	ND a	530	ug/kg	
91-57-6	2-Methylnaphthalene	ND a	530	ug/kg	
91-20-3	Naphthalene	ND a	530	ug/kg	
85-01-8	Phenanthrene	ND a	530	ug/kg	
129-00-0	Pyrene	ND a	530	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl		75%	40-140%
321-60-8	2-Fluorobiphenyl		60%	40-140%
580-13-2	2-Bromonaphthalene		47%	40-140%
3386-33-2	1-Chlorooctadecane	40%		40-140%

(a) Result is from Run# 2

ND = Not detected

RDL = Reported Detection Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

Report of Analysis

Page 1 of 1

Client Sample ID:	B-11/8-12'	Date Sampled:	12/10/98
Lab Sample ID:	M6447-5	Date Received:	12/14/98
Matrix:	SO - Soil	Percent Solids:	90.7
Method:	MADEP EPH		
Project:	VFW Pkwy. West. Roxbury		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GCH0565.D	1	12/29/98	TLQ	12/17/98	OP951	GCH29
Run #2	GCH0564.D	1	12/29/98	TLQ	12/17/98	OP951	GCH30

ABN Special List

CAS No.	Compound	Result	RDL	Units	Q
	C9-C18 Aliphatics	ND	6300	ug/kg	
	C19-C36 Aliphatics	ND	8400	ug/kg	
	C11-C22 Aromatics	ND ^a	18000	ug/kg	
	C11-C22 Aromatics (Unadj.)	ND ^a	18000	ug/kg	
83-32-9	Acenaphthene	ND ^a	520	ug/kg	
208-96-8	Acenaphthylene	ND ^a	520	ug/kg	
120-12-7	Anthracene	ND ^a	520	ug/kg	
56-55-3	Benzo (a) anthracene	ND ^a	520	ug/kg	
50-32-8	Benzo (a) pyrene	ND ^a	520	ug/kg	
205-99-2	Benzo (b) fluoranthene	ND ^a	520	ug/kg	
191-24-2	Benzo (g,h,i) perylene	ND ^a	520	ug/kg	
207-08-9	Benzo (k) fluoranthene	ND ^a	520	ug/kg	
218-01-9	Chrysene	ND ^a	520	ug/kg	
53-70-3	Dibenz(a,h)anthracene	ND ^a	520	ug/kg	
206-44-0	Fluoranthene	ND ^a	520	ug/kg	
86-73-7	Fluorene	ND ^a	520	ug/kg	
193-39-5	Indeno (1,2,3-cd) pyrene	ND ^a	520	ug/kg	
91-57-6	2-Methylnaphthalene	ND ^a	520	ug/kg	
91-20-3	Naphthalene	ND ^a	520	ug/kg	
85-01-8	Phenanthrene	ND ^a	520	ug/kg	
129-00-0	Pyrene	ND ^a	520	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl		72%	40-140%
321-60-8	2-Fluorobiphenyl		68%	40-140%
580-13-2	2-Bromonaphthalene		50%	40-140%
3386-33-2	1-Chlorooctadecane	74%		40-140%

(a) Result is from Run# 2

ND = Not detected

RDL = Reported Detection Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

Report of Analysis

Page 1 of 1

Client Sample ID:	B-7/8-12'	Date Sampled:	12/10/98
Lab Sample ID:	M6447-6	Date Received:	12/14/98
Matrix:	SO - Soil	Percent Solids:	85.0
Method:	MADEP VPH		
Project:	VFW Pkwy. West. Roxbury		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GE14774.D	1	12/17/98	AF	n/a	n/a	GCE486
Run #2							

MA-VPH List

CAS No.	Compound	Result	RDL	Units	Q
	C5- C8 Aliphatics	15700	5100	ug/kg	
	C9- C12 Aliphatics	ND	5100	ug/kg	
	C9- C10 Aromatics	17400	5100	ug/kg	
	C5- C8 Aliphatics (Unadj.)	17100	5100	ug/kg	
	C9- C12 Aliphatics (Unadj.)	19200	5100	ug/kg	
71-43-2	Benzene	ND	260	ug/kg	
100-41-4	Ethylbenzene	ND	260	ug/kg	
1634-04-4	Methyl Tert Butyl Ether	ND	260	ug/kg	
91-20-3	Naphthalene	485	260	ug/kg	
108-88-3	Toluene	471	260	ug/kg	
	m,p-Xylene	922	260	ug/kg	
95-47-6	o-Xylene	ND	260	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
615-59-8	2,5-Dibromotoluene	93 %		70-130 %
615-59-8	2,5-Dibromotoluene	104 %		70-130 %

ND = Not detected

RDL = Reported Detection Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound



Report of Analysis

Page 1 of 1

Client Sample ID: B-8/8-12'
Lab Sample ID: M6447-7
Matrix: SO - Soil
Method: MADEP VPH
Project: VFW Pkwy. West. Roxbury

Date Sampled: 12/10/98
Date Received: 12/14/98
Percent Solids: 85.7

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GE14775.D	1	12/17/98	AF	n/a	n/a	GCE486
Run #2							

MA-VPH List

CAS No.	Compound	Result	RDL	Units	Q
	C5- C8 Aliphatics	ND	6100	ug/kg	
	C9- C12 Aliphatics	ND	6100	ug/kg	
	C9- C10 Aromatics	ND	6100	ug/kg	
	C5- C8 Aliphatics (Unadj.)	ND	6100	ug/kg	
	C9- C12 Aliphatics (Unadj.)	ND	6100	ug/kg	
71-43-2	Benzene	ND	300	ug/kg	
100-41-4	Ethylbenzene	ND	300	ug/kg	
1634-04-4	Methyl Tert Butyl Ether	ND	300	ug/kg	
91-20-3	Naphthalene	ND	300	ug/kg	
108-88-3	Toluene	ND	300	ug/kg	
	m,p-Xylene	ND	300	ug/kg	
95-47-6	o-Xylene	ND	300	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
615-59-8	2,5-Dibromotoluene	75%		70-130%
615-59-8	2,5-Dibromotoluene	76%		70-130%

ND = Not detected

RDL = Reported Detection Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

**Report of Analysis**

Client Sample ID:	B-10/8-12'	Date Sampled:	12/10/98
Lab Sample ID:	M6447-8	Date Received:	12/14/98
Matrix:	SO - Soil	Percent Solids:	90.9
Method:	MADEP VPH		
Project:	VFW Pkwy. West. Roxbury		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GE14777.D	1	12/17/98	AF	n/a	n/a	GCE486
Run #2							

MA-VPH List

CAS No.	Compound	Result	RDL	Units	Q
	C5- C8 Aliphatics	101000	6200	ug/kg	
	C9- C12 Aliphatics	29800	6200	ug/kg	
	C9- C10 Aromatics	129000	6200	ug/kg	
	C5- C8 Aliphatics (Unadj.)	113000	6200	ug/kg	
	C9- C12 Aliphatics (Unadj.)	159000	6200	ug/kg	
71-43-2	Benzene	ND	310	ug/kg	
100-41-4	Ethylbenzene	1130	310	ug/kg	
1634-04-4	Methyl Tert Butyl Ether	ND	310	ug/kg	
91-20-3	Naphthalene	3720	310	ug/kg	
108-88-3	Toluene	1590	310	ug/kg	
	m,p-Xylene	8500	310	ug/kg	
95-47-6	o-Xylene	1160	310	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
615-59-8	2,5-Dibromotoluene	121%		70-130%
615-59-8	2,5-Dibromotoluene	129%		70-130%

ND = Not detected

RDL = Reported Detection Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

**Report of Analysis**

Page 1 of 1

Client Sample ID: B-11/8-12'	
Lab Sample ID: M6447-9	Date Sampled: 12/10/98
Matrix: SO - Soil	Date Received: 12/14/98
Method: MADEP VPH	Percent Solids: 90.5
Project: VFW Pkwy. West. Roxbury	

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GE14778.D	1	12/17/98	AF	n/a	n/a	GCE486
Run #2							

MA-VPH List

CAS No.	Compound	Result	RDL	Units	Q
	C5- C8 Aliphatics	ND	5600	ug/kg	
	C9- C12 Aliphatics	ND	5600	ug/kg	
	C9- C10 Aromatics	ND	5600	ug/kg	
	C5- C8 Aliphatics (Unadj.)	ND	5600	ug/kg	
	C9- C12 Aliphatics (Unadj.)	ND	5600	ug/kg	
71-43-2	Benzene	ND	280	ug/kg	
100-41-4	Ethylbenzene	ND	280	ug/kg	
1634-04-4	Methyl Tert Butyl Ether	ND	280	ug/kg	
91-20-3	Naphthalene	ND	280	ug/kg	
108-88-3	Toluene	ND	280	ug/kg	
	m,p-Xylene	347	280	ug/kg	
95-47-6	o-Xylene	ND	280	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
615-59-8	2,5-Dibromotoluene	84%		70-130%
615-59-8	2,5-Dibromotoluene	81%		70-130%

ND = Not detected

RDL = Reported Detection Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

GENERAL INFORMATION

☐ Aqueous	☒ Soil	☐ Sediment	☐ Other:
☒ Satisfactory	☐ Broken	☐ Leaking	
Preservatives: ☒ N/A	☐ pH <= 2	☐ pH > 2	☐ Comment:
Received on Ice	☒ Received at 4 deg.		☐ Other
Method: Water: Liquid/Liquid (SW3510C)	Soil: Sonication (SW3550B)		

ANALYTICAL RESULTS

Ranges: MADEP EPH 98-1		Client ID	B-10/8-12'		B-11/8-12'		B-7/8-12'		
Target Analytes: MADEP EPH 98-1		Lab ID	M6447-4		M6447-5		M6447-1		
Matrix Standards		Date Collected	12/10/98		12/10/98		12/10/98		
1-Chlorooctadecane		Date Received	12/14/98		12/14/98		12/14/98		
1,2,4-Trisphenyl		Date Extracted	12/17/98		12/17/98		12/17/98		
Ionization Surrogates		Date Analyzed	12/29/98		12/29/98		12/29/98		
1,2,4-Trisphenyl		Dilution Factor	1		1		1		
Naphthalene		% Moisture (soil)	7.4		9.3		11.7		
Target Analyte		Units	Result	RL	Q	Result	RL	Q	
C11-C22 Aromatics(1)			141000	18000		ND	18000		
Aromatics	Naphthalene	ug/kg	ND	530		ND	520		
	2-Methylnaphthalene	ug/kg	ND	530		ND	520		
	Phenanthrene	ug/kg	ND	530		ND	520		
	Acenaphthalene	ug/kg	ND	530		ND	520		
Aromatics	Acenaphthene	ug/kg	ND	530		ND	520		
	Anthracene	ug/kg	ND	530		ND	520		
	Benzo (a) anthracene	ug/kg	ND	530		ND	520		
	Benzo (a) pyrene	ug/kg	ND	530		ND	520		
	Benzo (b) fluoranthene	ug/kg	ND	530		ND	520		
	Benzo (g,h,i) perylene	ug/kg	ND	530		ND	520		
	Benzo (k) fluoranthene	ug/kg	ND	530		ND	520		
	Chrysene	ug/kg	ND	530		ND	520		
	Dibenz(a,h)anthracene	ug/kg	ND	530		ND	520		
	Fluoranthene	ug/kg	ND	530		ND	520		
	Fluorene	ug/kg	ND	530		ND	520		
	Indeno (1,2,3-cd) pyrene	ug/kg	ND	530		ND	520		
	Pyrene	ug/kg	ND	530		ND	520		
	Aliphatic Hydrocarbons (1)		ug/kg	83200	6300		ND	6300	
	Aliphatic Hydrocarbons (1)		ug/kg	2810000	8400		ND	8400	
	Aromatic Hydrocarbons (1,2)			141000	18000		ND	18000	
Surrogate % Recovery			40			74			
Surrogate % Recovery			75			72			
Surrogate Acceptance Range			40-140 %			40-140 %			
Surrogate % Recovery			60			68			
Surrogate % Recovery			47			50			
Surrogate Acceptance Range			40-140 %			40-140 %			
Range data exclude concentrations of any surrogate(s) and/or internal standards eluting in that range									
Aromatic Hydrocarbons exclude the concentration of Target PAH Analytes									
er indicates an estimated value									

QUALIFICATION

QC procedures REQUIRED by the EPH Method followed?	☒ Yes	☐ No - Details Attached
Performance/acceptance standards for required QA/QC procedures achieved?	☒ Yes	☐ No - Details Attached
Significant modifications made to the EPH method, as specified in Sect 11.3?	☒ No	☐ Yes - Details Attached
I, the undersigned, declare under the pains and penalties of perjury that, based upon my inquiry of those individuals immediately responsible for the collection, analysis, and reporting of the data contained in this report, the data are, to the best of my knowledge and belief, accurate and reliable.		
SIGNATURE: <u>Reza Tand</u>	POSITION: <u>Laboratory Director</u>	
PRINTED NAME: <u>Reza Tand</u>	DATE: <u>01/05/99</u>	



GENERAL INFORMATION

☐ Aqueous	☒ Soil	☐ Sediment	☐ Other:
☒ Satisfactory	☐ Broken	☐ Leaking	
Preservatives ☒ N/A	☐ pH <= 2	☐ pH > 2	☐ Comment:
Received on Ice	☒ Received at 4 deg.	☐ Other	
Method	Water: Liquid/Liquid (SW3510C)	Soil: Sonication (SW3550B)	

ANALYTICAL RESULTS

Target Ranges: MADEP EPH 98-1	Client ID	B-8/8-12'	B-8/8-10'	
Target Analytes: MADEP EPH 98-1	Lab ID	M6447-2	M6447-3	
Surrogate Standards	Date Collected	12/10/98	12/10/98	
1-Chlorooctadecane	Date Received	12/14/98	12/14/98	
o-Terphenyl	Date Extracted	12/17/98	12/17/98	
Ionization Surrogates	Date Analyzed	12/29/98	12/29/98	
Triphenyl	Dilution Factor	1	1	
Naphthalene	% Moisture (soil)	12.9	11.8	
Target Analyte	Units	Result	RL	Q
Sum of C11-C22 Aromatics(1)		245000	18000	
H Naphthalene	ug/kg	566	520	
2-Methylnaphthalene	ug/kg	764	520	
Phenanthrene	ug/kg	ND	520	
Acenaphthalene	ug/kg	ND	520	
H Acenaphthene	ug/kg	ND	520	
Anthracene	ug/kg	ND	520	
Benzo (a) anthracene	ug/kg	ND	520	
Benzo (a) pyrene	ug/kg	ND	520	
Benzo (b) fluoranthene	ug/kg	ND	520	
Benzo (g,h,i) perylene	ug/kg	ND	520	
Benzo (k) fluoranthene	ug/kg	ND	520	
Chrysene	ug/kg	ND	520	
Dibenz(a,h)anthracene	ug/kg	ND	520	
Fluoranthene	ug/kg	ND	520	
Fluorene	ug/kg	ND	520	
Indeno (1,2,3-cd) pyrene	ug/kg	ND	520	
Pyrene	ug/kg	900	520	
Aliphatic Hydrocarbons (1)	ug/kg	ND	6300	
Aliphatic Hydrocarbons (1)	ug/kg	19100	8400	
Aromatic Hydrocarbons (1,2)		243000	18000	
Surrogate % Recovery		86		
Surrogate % Recovery		81		
Surrogate Acceptance Range		40-140 %		
on Surrogate % Recovery		62		
on Surrogate % Recovery		54		
on Surrogate Acceptance Range		40-140 %		
in Range data exclude concentrations of any surrogate(s) and/or internal standards eluting in that range				
romatic Hydrocarbons exclude the concentration of Target PAH Analytes				
ifier indicates an estimated value				

QUALIFICATION

QC procedures REQUIRED by the EPH Method followed?	☒ Yes	☐ No - Details Attached
Performance/acceptance standards for required QA/QC procedures achieved?	☒ Yes	☐ No - Details Attached
Significant modifications made to the EPH method, as specified in Sect 11.3?	☒ No	☐ Yes - Details Attached

I, the undersigned, being duly sworn, depose and say that the facts and statements herein are true and correct, and that the material contained in this report is, to the best of my knowledge and belief, accurate and complete.

SIGNATURE: Reza Tand POSITION: Laboratory Director

TESTED NAME: Reza Tand DATE: 01/05/99

**ACCUTEST®****GENERAL INFORMATION**

☐ Aqueous	☒ Soil	☐ Sediment	☐ Other:
☒ Satisfactory			
☐ Broken			
☐ Leaking:			
Aqueous	☒ N/A	☐ pH <= 2	☐ pH > 2
Soil or	☐ N/A ☐ Samples NOT preserved in Methanol or air-tight container		
Sediment	☒ Samples rec'd in Methanol: ☒ covering soil ☐ not covering soil		
☐ Samples rec'd in air-tight container:			mL Methanol/g soil
☒ Received on Ice			☒ Rec'd at 4 Deg. C
☐ Other:			☒ 1:1 +/- 25% ☐ Other:

ANALYTICAL RESULTS

Range: MADEP VPH 98-1	Client ID		B-8/8-12'	B-9/8-10'		
Target Analytes: MADEP VPH 98-1	Lab ID		M6447-7	M6447-3		
Target Standards	Date Collected		12/10/98	12/10/98		
5-Dibromotoluene	Date Received		12/14/98	12/14/98		
5-Dibromotoluene	Date Analyzed		12/17/98	12/16/98		
	Dilution Factor		1	1		
	% Moisture (soil)		14.3	11.8		
Target Analyte	Elution Range	Units	Result	RL	Q	
C5-C8 Aliphatics (1)	N/A		ND	6100	26300	3900
C9-C12 Aliphatics (1)	N/A		ND	6100	41500	3900
ne	C5-C8	ug/kg	ND	300	ND	200
butylether	C5-C8	ug/kg	ND	300	696	200
e	C5-C8	ug/kg	ND	300	ND	200
	N/A	ug/kg	ND	300	1260	200
	C5-C8	ug/kg	ND	300	367	200
enes	C5-C8	ug/kg	ND	300	3590	200
	C5-C8	ug/kg	ND	300	413	200
omatic Hydrocarbons (1,2)	N/A	ug/kg	ND	6100	21300	3900
romatic Hydrocarbons (1,3)	N/A	ug/kg	ND	6100	5680	3900
romatic Hydrocarbons (1)	N/A	ug/kg	ND	6100	35800	3900
ate % Recovery			76		116	
ate % Recovery			75		103	
Acceptance Range			70-130 %		70-130 %	
on Range data exclude concentrations of any surrogate(s) and/or internal standards eluting in that range						
omatic Hydrocarbons exclude the concentration of Target Analytes eluting in that range						
omatic Hydrocarbons exclude conc of Target Analytes eluting in that range AND concentration of C9-C10 Aromatic Hydrocarbons						
er indicates an estimated value						

QUALIFICATION

QC procedures REQUIRED by the VPH Method followed?	☒ Yes	☐ No - Details Attached
Performance/acceptance standards for required QA/QC procedures achieved?	☒ Yes	☐ No - Details Attached
Significant modifications made to the VPH method, as specified in Sect 11.37	☒ No	☐ Yes - Details Attached
I, the undersigned, declare under the pains and penalties of perjury that, based upon my inquiry of those individuals immediately responsible for the collection, analysis, and reporting of the data, the material contained in this report is, to the best of my knowledge and belief, accurate and reliable.		
SIGNATURE: <u>Reza Tand</u>	POSITION: Laboratory Director	
PRINTED NAME: <u>Reza Tand</u>	DATE: <u>01/05/99</u>	

E INFORMATION

☐ Aqueous	☒ Soil	☐ Sediment	☐ Other
☒ Satisfactory	☐ Broken	☐ Leaking:	
Aqueous	☒ N/A	☐ pH <= 2	☐ pH > 2
Soil or	☐ N/A	☐ Samples NOT preserved in Methanol or air-tight container	
Sediment	☒ Samples rec'd in Methanol:	☒ covering soil	☐ not covering soil
	☐ Samples rec'd in air-tight container:		
☒ Received on Ice		☒ Rec'd at 4 Deg. C	☐ Other:

ANALYTICAL RESULTS

Surrogate Ranges: MADEP VPH 98-1	Client ID		B-10/8-12'		B-11/8-12'		B-7/8-12'		
Surrogate Standards	Lab ID		M6447-8		M6447-9		M6447-6		
1,5-Dibromotoluene	Date Collected		12/10/98		12/10/98		12/10/98		
1,5-Dibromotoluene	Date Received		12/14/98		12/14/98		12/14/98		
	Date Analyzed		12/17/98		12/17/98		12/17/98		
	Dilution Factor		1		1		1		
	% Moisture (soil)		9.1		9.5		15		
Target Analyte	Elution Range	Units	Result	RL	Q	Result	RL	Q	
Aliphatic C5-C8 (1)	N/A		113000	6200		ND	5600		
Aliphatic C9-C12 (1)	N/A		159000	6200		ND	5600		
Aliphatic C5-C8	C5-C8	ug/kg	ND	310		ND	280		
Aliphatic C5-C8	C5-C8	ug/kg	1130	310		ND	280		
Aliphatic C5-C8	C5-C8	ug/kg	ND	310		ND	280		
Aliphatic C5-C8	N/A	ug/kg	3720	310		ND	280		
Aliphatic C5-C8	C5-C8	ug/kg	1590	310		ND	280		
Aliphatic C5-C8	C5-C8	ug/kg	8500	310		347	280		
Aliphatic C5-C8	C5-C8	ug/kg	1160	310		ND	280		
Aromatic C10-C14 (1,2)	N/A	ug/kg	101000	6200		ND	5600		
Aromatic C10-C14 (1,3)	N/A	ug/kg	29800	6200		ND	5600		
Aromatic C10-C14 (1)	N/A	ug/kg	129000	6200		ND	5600		
Recovery %			129			81			
Recovery %			121			84			
Acceptance Range			70-130 %			70-130 %			

Surrogate Range data exclude concentrations of any surrogate(s) and/or internal standards eluting in that range

Aliphatic Hydrocarbons exclude the concentration of Target Analytes eluting in that range

Aliphatic Hydrocarbons exclude conc of Target Analytes eluting in that range AND concentration of C9-C10 Aromatic Hydrocarbons

After indicates an estimated value

CATION

QC procedures REQUIRED by the VPH Method followed?	☒ Yes	☐ No - Details Attached
Performance/acceptance standards for required QA/QC procedures achieved?	☒ Yes	☐ No - Details Attached
Significant modifications made to the VPH method, as specified in Sect 11.37	☒ No	☐ Yes - Details Attached

I, the undersigned, do hereby certify that the pains and penalties of perjury that, based upon my inquiry of those individuals immediately responsible for the collection, analysis, and reporting of the data contained in this report is, to the best of my knowledge and belief, accurate and reliable.

SIGNATURE: Reza Tand

PRINTED NAME: Reza Tand

POSITION: Laboratory Director

DATE: 01/05/99

16447

Bottle #	Empty VOA	VOA w/ 15 ml. MeOH
9.9.10	26.39	26.09
9.9.12	26.99	26.09
9.9.11	26.29	26.09

Technical Report for

IES, Inc.

VFW Pkwy. West. Roxbury

797-159

Accutest Job Number: M6459

Report to:

IES, Inc.
265 Medford St.
Sommerville, MA 02143

ATTN: Danneil Jaffe

Total number of pages in report: 19

Reza Tand
Lab Director

Certifications: MA (MA136) CT (PH-0109) NH (250293) NJ (59928) RI (A-71) ME (MA136)

Results relate only to the items tested.

This report shall not be reproduced, except in its entirety, without the written approval of Accutest Laboratories

Sample Summary

IES, Inc.

VFW Pkwy. West. Roxbury
Project No: 797-159

Date: 01/11/99
Job No: M6459

Sample Number	Collected Date	Time By	Received	Matrix Code	Type	Client Sample ID
M6459-1	12/15/98	00:00 DJ	12/15/98	AQ	Ground Water	B-7
M6459-2	12/15/98	00:00 DJ	12/15/98	AQ	Ground Water	B-8
M6459-3	12/15/98	00:00 DJ	12/15/98	AQ	Ground Water	B-9
M6459-4	12/15/98	00:00 DJ	12/15/98	AQ	Ground Water	BLANK
M6459-5	12/15/98	00:00 DJ	12/15/98	AQ	Ground Water	B-7
M6459-6	12/15/98	00:00 DJ	12/15/98	AQ	Ground Water	B-8
M6459-7	12/15/98	00:00 DJ	12/15/98	AQ	Ground Water	B-9
M6459-8	12/15/98	00:00 DJ	12/15/98	AQ	Ground Water	BLANK
M6459-9	12/15/98	00:00 DJ	12/15/98	AQ	Ground Water	B-8
M6459-10	12/15/98	00:00 DJ	12/15/98	AQ	Ground Water	B-8
M6459-11	12/15/98	00:00 DJ	12/15/98	AQ	Ground Water	B-8
M6459-12	12/15/98	00:00 DJ	12/15/98	AQ	Ground Water	B-8

**ACCUTEST**

Report of Analysis

Page 1 of 1

Client Sample ID: B-7
 Lab Sample ID: M6459-1
 Matrix: AQ - Ground Water
 Method: MADEP EPH
 Project: VFW Pkwy. West. Roxbury

Date Sampled: 12/15/98
 Date Received: 12/15/98
 Percent Solids: n/a

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GD19764F.D	1	01/05/99	TLQ	12/22/98	OP960	GCD824
Run #2	GD19764E.D	1	01/05/99	TLQ	12/22/98	OP960	GCD823

ABN Special List

CAS No.	Compound	Result	RDL	Units	Q
	C9-C18 Aliphatics	ND	63	ug/l	
	C9-C18 Aliphatics	580 ^a	63	ug/l	
	C19-C36 Aliphatics	10200 ^a	84	ug/l	
	C11-C22 Aromatics	ND	180	ug/l	
	C11-C22 Aromatics (Unadj.)	ND	180	ug/l	
83-32-9	Acenaphthene	ND	5.3	ug/l	
208-96-8	Acenaphthylene	ND	5.3	ug/l	
120-12-7	Anthracene	ND	5.3	ug/l	
56-55-3	Benzo (a) anthracene	ND	5.3	ug/l	
50-32-8	Benzo (a) pyrene	ND	5.3	ug/l	
205-99-2	Benzo (b) fluoranthene	ND	5.3	ug/l	
191-24-2	Benzo (g,h,i) perylene	ND	5.3	ug/l	
207-08-9	Benzo (k) fluoranthene	ND	5.3	ug/l	
218-01-9	Chrysene	ND	5.3	ug/l	
53-70-3	Dibenz(a,h)anthracene	ND	5.3	ug/l	
206-44-0	Fluoranthene	ND	5.3	ug/l	
86-73-7	Fluorene	ND	5.3	ug/l	
193-39-5	Indeno (1,2,3-cd) pyrene	ND	5.3	ug/l	
91-57-6	2-Methylnaphthalene	ND	5.3	ug/l	
91-20-3	Naphthalene	ND	5.3	ug/l	
85-01-8	Phenanthrene	ND	5.3	ug/l	
129-00-0	Pyrene	ND	5.3	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	48%		40-140%
321-60-8	2-Fluorobiphenyl	42%		40-140%
3386-33-2	1-Chlorooctadecane		40%	40-140%
580-13-2	2-Bromonaphthalene	40%		40-140%

(a) Result is from Run# 2

ND = Not detected

RDL = Reported Detection Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

Report of Analysis

Page 1 of 1

Client Sample ID: B-8
Lab Sample ID: M6459-2
Matrix: AQ - Ground Water
Method: MADEP EPH
Project: VFW Pkwy. West. Roxbury

Date Sampled: 12/15/98
Date Received: 12/15/98
Percent Solids: n/a

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GD19764H.D	1	01/05/99	TLQ	12/22/98	OP960	GCD824
Run #2	GD19764G.D	1	01/05/99	TLQ	12/22/98	OP960	GCD823

ABN Special List

CAS No.	Compound	Result	RDL	Units	Q
	C9-C18 Aliphatics	ND ^a	65	ug/l	
	C19-C36 Aliphatics	329 ^a	87	ug/l	
	C11-C22 Aromatics	ND	180	ug/l	
	C11-C22 Aromatics (Unadj.)	ND	180	ug/l	
83-32-9	Acenaphthene	ND	5.4	ug/l	
208-96-8	Acenaphthylene	ND	5.4	ug/l	
120-12-7	Anthracene	ND	5.4	ug/l	
56-55-3	Benzo (a) anthracene	ND	5.4	ug/l	
50-32-8	Benzo (a) pyrene	ND	5.4	ug/l	
205-99-2	Benzo (b) fluoranthene	ND	5.4	ug/l	
191-24-2	Benzo (g,h,i) perylene	ND	5.4	ug/l	
207-08-9	Benzo (k) fluoranthene	ND	5.4	ug/l	
218-01-9	Chrysene	ND	5.4	ug/l	
53-70-3	Dibenz(a,h)anthracene	ND	5.4	ug/l	
206-44-0	Fluoranthene	ND	5.4	ug/l	
86-73-7	Fluorene	ND	5.4	ug/l	
193-39-5	Indeno (1,2,3-cd) pyrene	ND	5.4	ug/l	
91-57-6	2-Methylnaphthalene	ND	5.4	ug/l	
91-20-3	Naphthalene	ND	5.4	ug/l	
85-01-8	Phenanthrene	ND	5.4	ug/l	
129-00-0	Pyrene	ND	5.4	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	68%		40-140%
321-60-8	2-Fluorobiphenyl	73%		40-140%
3386-33-2	1-Chlorooctadecane		43%	40-140%
580-13-2	2-Bromonaphthalene	79%		40-140%

(a) Result is from Run# 2

ND = Not detected

RDL = Reported Detection Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

Report of Analysis

Page 1 of 1

Client Sample ID: B-7
Lab Sample ID: M6459-5
Matrix: AQ - Ground Water
Method: MADEP VPH
Project: VFW Pkwy. West. Roxbury

Date Sampled: 12/15/98
Date Received: 12/15/98
Percent Solids: n/a

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GE14824.D	1	12/19/98	AF	n/a	n/a	GCE487
Run #2							

MA-VPH List

CAS No.	Compound	Result	RDL	Units	Q
	C5- C8 Aliphatics	124	100	ug/l	
	C9- C12 Aliphatics	ND	100	ug/l	
	C9- C10 Aromatics	432	100	ug/l	
	C5- C8 Aliphatics (Unadj.)	168	100	ug/l	
	C9- C12 Aliphatics (Unadj.)	459	100	ug/l	
71-43-2	Benzene	10.4	5.0	ug/l	
100-41-4	Ethylbenzene	ND	5.0	ug/l	
1634-04-4	Methyl Tert Butyl Ether	8.7	5.0	ug/l	
91-20-3	Naphthalene	7.6	5.0	ug/l	
108-88-3	Toluene	ND	5.0	ug/l	
	m,p-Xylene	24.1	5.0	ug/l	
95-47-6	o-Xylene	ND	5.0	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
615-59-8	2,5-Dibromotoluene	84%		70-130%
615-59-8	2,5-Dibromotoluene	96%		70-130%

ND = Not detected
 RDL = Reported Detection Limit
 E = Indicates value exceeds calibration range

J = Indicates an estimated value
 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound

Report of Analysis

Page 1 of 1

Client Sample ID:	B-8		
Lab Sample ID:	M6459-6	Date Sampled:	12/15/98
Matrix:	AQ - Ground Water	Date Received:	12/15/98
Method:	MADEP VPH	Percent Solids:	n/a
Project:	VFW Pkwy. West. Roxbury		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GE14802.D	1	12/18/98	AF	n/a	n/a	GCE487
Run #2							

MA-VPH List

CAS No.	Compound	Result	RDL	Units	Q
	C5- C8 Aliphatics	ND	100	ug/l	
	C9- C12 Aliphatics	ND	100	ug/l	
	C9- C10 Aromatics	ND	100	ug/l	
	C5- C8 Aliphatics (Unadj.)	ND	100	ug/l	
	C9- C12 Aliphatics (Unadj.)	ND	100	ug/l	
71-43-2	Benzene	ND	5.0	ug/l	
100-41-4	Ethylbenzene	ND	5.0	ug/l	
1634-04-4	Methyl Tert Butyl Ether	ND	5.0	ug/l	
91-20-3	Naphthalene	ND	5.0	ug/l	
108-88-3	Toluene	ND	5.0	ug/l	
	m,p-Xylene	ND	5.0	ug/l	
95-47-6	o-Xylene	ND	5.0	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
615-59-8	2,5-Dibromotoluene	78%		70-130%
615-59-8	2,5-Dibromotoluene	76%		70-130%

ND = Not detected

RDL = Reported Detection Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

**Report of Analysis**

Page 1 of 1

Client Sample ID:	B-9	Date Sampled:	12/15/98
Lab Sample ID:	M6459-7	Date Received:	12/15/98
Matrix:	AQ - Ground Water	Percent Solids:	n/a
Method:	MADEP VPH		
Project:	VFW Pkwy. West. Roxbury		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GE14803.D	1	12/18/98	AF	n/a	n/a	GCE487
Run #2							

MA-VPH List

CAS No.	Compound	Result	RDL	Units	Q
	C5- C8 Aliphatics	ND	100	ug/l	
	C9- C12 Aliphatics	ND	100	ug/l	
	C9- C10 Aromatics	ND	100	ug/l	
	C5- C8 Aliphatics (Unadj.)	ND	100	ug/l	
	C9- C12 Aliphatics (Unadj.)	ND	100	ug/l	
71-43-2	Benzene	ND	5.0	ug/l	
100-41-4	Ethylbenzene	ND	5.0	ug/l	
1634-04-4	Methyl Tert Butyl Ether	ND	5.0	ug/l	
91-20-3	Naphthalene	ND	5.0	ug/l	
108-88-3	Toluene	ND	5.0	ug/l	
	m,p-Xylene	ND	5.0	ug/l	
95-47-6	o-Xylene	ND	5.0	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
615-59-8	2,5-Dibromotoluene	81%		70-130%
615-59-8	2,5-Dibromotoluene	79%		70-130%

ND = Not detected

RDL = Reported Detection Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

Report of Analysis

Page 1 of 1

Client Sample ID: BLANK
Lab Sample ID: M6459-8
Matrix: AQ - Ground Water
Method: MADEP VPH
Project: VFW Pkwy. West. Roxbury

Date Sampled: 12/15/98
Date Received: 12/15/98
Percent Solids: n/a

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GE14766.D	1	12/16/98	AF	n/a	n/a	GCE487
Run #2							

MA-VPH List

CAS No.	Compound	Result	RDL	Units	Q
	C5- C8 Aliphatics	ND	100	ug/l	
	C9- C12 Aliphatics	ND	100	ug/l	
	C9- C10 Aromatics	ND	100	ug/l	
	C5- C8 Aliphatics (Unadj.)	ND	100	ug/l	
	C9- C12 Aliphatics (Unadj.)	ND	100	ug/l	
71-43-2	Benzene	ND	5.0	ug/l	
100-41-4	Ethylbenzene	ND	5.0	ug/l	
1634-04-4	Methyl Tert Butyl Ether	ND	5.0	ug/l	
91-20-3	Naphthalene	ND	5.0	ug/l	
108-88-3	Toluene	ND	5.0	ug/l	
	m,p-Xylene	ND	5.0	ug/l	
95-47-6	o-Xylene	ND	5.0	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
615-59-8	2,5-Dibromotoluene	82%		70-130%
615-59-8	2,5-Dibromotoluene	90%		70-130%

ND = Not detected

RDL = Reported Detection Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

Report of Analysis

Page 1 of 1

Client Sample ID:	B-8	Date Sampled:	12/15/98
Lab Sample ID:	M6459-9	Date Received:	12/15/98
Matrix:	AQ - Ground Water	Percent Solids:	n/a
Project:	VFW Pkwy. West. Roxbury		

General Chemistry

Analyte	Result	RDL	Units	DF	Analyzed By	Method
Oxygen, Dissolved	0.40	1.0	mg/l	1	12/15/98 MA	EPA 360.1

RDL = Reported Detection Limit

Report of Analysis

Page 1 of 1

Client Sample ID:	B-8	Date Sampled:	12/15/98
Lab Sample ID:	M6459-10	Date Received:	12/15/98
Matrix:	AQ - Ground Water	Percent Solids:	n/a
Project:	VFW Pkwy. West. Roxbury		

General Chemistry

Analyte	Result	RDL	Units	DF	Analyzed By	Method
Nitrogen, Nitrate ^a	<0.12	0.12	mg/l	1	12/22/98 HBM	EPA 353.2

(a) Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)

RDL = Reported Detection Limit

Report of Analysis

Page 1 of 1

Client Sample ID:	B-8	Date Sampled:	12/15/98
Lab Sample ID:	M6459-11	Date Received:	12/15/98
Matrix:	AQ - Ground Water	Percent Solids:	n/a
Project:	VFW Pkwy. West. Roxbury		

General Chemistry

Analyte	Result	RDL	Units	DF	Analyzed By	Method
Phosphorus, Total	51.5	2.0	mg/l	20	12/21/98 SG	EPA 365.4

RDL = Reported Detection Limit

**ACCUTEST**

Report of Analysis

Page 1 of 1

Client Sample ID:	B-8	Date Sampled:	12/15/98
Lab Sample ID:	M6459-12	Date Received:	12/15/98
Matrix:	AQ - Ground Water	Percent Solids:	n/a
Project:	VFW Pkwy. West. Roxbury		

General Chemistry

Analyte	Result	RDL	Units	DF	Analyzed By	Method
Redox Potential Vs H2 ^a	314		mv	1	12/18/98 ANJ	ASTM D1498-76

(a) Analysis performed at Accutest Laboratories, Dayton, NJ. MA CERT NJ141.

RDL = Reported Detection Limit

**ACCUTEST®****GENERAL INFORMATION**

☒ Aqueous	☐ Soil	☐ Sediment	☐ Other:
☒ Satisfactory	☐ Broken	☐ Leaking	
Preservatives: ☐ N/A	☒ pH <= 2	☐ pH > 2	☐ Comment:
☐	☒ Received on Ice	☒ Received at 4 deg.	☐ Other
Method: Water: Liquid/Liquid (SW3510C)	Soil: Sonication (SW3550B)		

ANALYTICAL RESULTS

Target Ranges: MADEP EPH 98-1	Client ID	BLANK		
Target Analytes: MADEP EPH 98-1	Lab ID	M6459-4		
Surrogate Standards	Date Collected	12/15/98		
1-Chlorooctadecane	Date Received	12/15/98		
2,4,6-Tris(4-methylphenyl)-o-Terphenyl	Date Extracted	12/22/98		
Ionization Surrogates	Date Analyzed	12/25/98		
2,4,6-Tris(4-methylphenyl)-o-Terphenyl	Dilution Factor	1		
Naphthalene	% Moisture (soil)			
Target Analyte	Units	Result	RL	Q
11-C11-C22 Aromatics(1)		ND	180	
Naphthalene	ug/l	ND	5.3	
2-Methylnaphthalene	ug/l	ND	5.3	
Phenanthrene	ug/l	ND	5.3	
Acenaphthalene	ug/l	ND	5.3	
Acenaphthene	ug/l	ND	5.3	
Anthracene	ug/l	ND	5.3	
Benzo (a) anthracene	ug/l	ND	5.3	
Benzo (a) pyrene	ug/l	ND	5.3	
Benzo (b) fluoranthene	ug/l	ND	5.3	
Benzo (g,h,i) perylene	ug/l	ND	5.3	
Benzo (k) fluoranthene	ug/l	ND	5.3	
Chrysene	ug/l	ND	5.3	
Dibenz(a,h)anthracene	ug/l	ND	5.3	
Fluoranthene	ug/l	ND	5.3	
Fluorene	ug/l	ND	5.3	
Indeno (1,2,3-cd) pyrene	ug/l	ND	5.3	
Pyrene	ug/l	ND	5.3	
Aromatic Hydrocarbons (1)	ug/l	ND	63	
Aliphatic Hydrocarbons (1)	ug/l	ND	84	
Aromatic Hydrocarbons (1,2)		ND	180	
Surrogate % Recovery		86		
Surrogate % Recovery		100		
Surrogate Acceptance Range		40-140 %		
Surrogate % Recovery		94		
Surrogate % Recovery		100		
Surrogate Acceptance Range		40-140 %		
Range data exclude concentrations of any surrogate(s) and/or internal standards eluting in that range				
Aromatic Hydrocarbons exclude the concentration of Target PAH Analytes				
asterisk indicates an estimated value				

QUALIFICATION

QC procedures REQUIRED by the EPH Method followed?	☒ Yes	☐ No - Details Attached
Performance/acceptance standards for required QA/QC procedures achieved?	☒ Yes	☐ No - Details Attached
Significant modifications made to the EPH method, as specified in Sect 11.3?	☒ No	☐ Yes - Details Attached
I, the undersigned, being duly sworn, depose and say that the pains and penalties of perjury that, based upon my inquiry of those individuals immediately responsible for the collection, analysis, and reporting of the data contained in this report is, to the best of my knowledge and belief, accurate and true.		
SIGNATURE: <u>Reza Tand</u>	POSITION: <u>Laboratory Director</u>	
TESTED NAME: <u>Reza Tand</u>	DATE: <u>01/11/99</u>	

INFORMATION

☒ Aqueous	☐ Soil	☐ Sediment	☐ Other:
☒ Satisfactory	☐ Broken	☐ Leaking:	
Aqueous	☐ N/A	☒ pH <= 2	☐ pH > 2
Soil or Sediment	☐ N/A	☐ Samples NOT preserved in Methanol or air-tight container	
	☐ Samples rec'd in Methanol:	☐ covering soil	☐ not covering soil
	☐ Samples rec'd in air-tight container:		☐ Other:
☐ Received on Ice	☒ Rec'd at 4 Deg. C	☐ Other:	

ANALYTICAL RESULTS

Range: MADEP VPH 98-1	Client ID		B-7		B-8		B-9		
Target Analytes: MADEP VPH 98-1	Lab ID		M6459-5		M6459-6		M6459-7		
ate Standards	Date Collected		12/15/98		12/15/98		12/15/98		
-Dibromotoluene	Date Received		12/15/98		12/15/98		12/15/98		
-Dibromotoluene	Date Analyzed		12/19/98		12/18/98		12/18/98		
	Dilution Factor		1		1		1		
	% Moisture (soil)								
et Analyte	Elution Range	Units	Result	RL	Q	Result	RL	Q	
C5-C8 Aliphatics (1)	N/A		168	100		ND	100		
C9-C12 Aliphatics (1)	N/A		459	100		ND	100		
	C5-C8	ug/l	10.4	5		ND	5		
e	C5-C8	ug/l	ND	5		ND	5		
butylether	C5-C8	ug/l	8.7	5		ND	5		
	N/A	ug/l	7.6	5		ND	5		
	C5-C8	ug/l	ND	5		ND	5		
nes	C5-C8	ug/l	24.1	5		ND	5		
	C5-C8	ug/l	ND	5		ND	5		
atic Hydrocarbons (1,2)	N/A	ug/l	124	100		ND	100		
atic Hydrocarbons (1,3)	N/A	ug/l	ND	100		ND	100		
atic Hydrocarbons (1)	N/A	ug/l	432	100		ND	100		
te % Recovery			96			76			
te % Recovyer			84			78			
ceptance Range			70-130 %			70-130 %			

Range data exclude concentrations of any surrogate(s) and/or internal standards eluting in that range

atic Hydrocarbons exclude the concentration of Target Analytes eluting in that range

atic Hydrocarbons exclude conc of Target Analytes eluting in that range AND concentration of C9-C10 Aromatic Hydrocarbons

r indicates an estimated value

ATION

procedures REQUIRED by the VPH Method followed?	☒ Yes	☐ No - Details Attached
ance/acceptance standards for required QA/QC procedures achieved?	☒ Yes	☐ No - Details Attached
icant modifications made to the VPH method, as specified in Sect 11.37	☒ No	☐ Yes - Details Attached

I swear under the pains and penalties of perjury that, based upon my inquiry of those individuals immediately responsible for the collection, analysis, and reporting of the data, the material contained in this report is, to the best of my knowledge and belief, accurate and reliable.

SIGNATURE: Reza Tand POSITION: Laboratory Director

PRINTED NAME: Reza Tand DATE: 01/11/99

**ACCUTEST****GENERAL INFORMATION**

☒ Aqueous	☐ Soil	☐ Sediment	☐ Other:
☒ Satisfactory	☐ Broken	☐ Leaking:	
☐ Aqueous	☐ N/A	☒ pH <= 2	☐ pH > 2
Soil or	☐ N/A	☐ Samples NOT preserved in Methanol or air-tight container	
Sediment	☐ Samples rec'd in Methanol: ☐ covering soil ☐ not covering soil		mL Methanol/g soil
	☐ Samples rec'd in air-tight container:		☐ 1:1 +/- 25%
			☐ Other
☐ Received on Ice	☒ Rec'd at 4 Deg. C		☐ Other:

ANALYTICAL RESULTS

Surrogate Standards	Client ID		BLANK			
2,5-Dibromotoluene	Lab ID		M6459-8			
2,5-Dibromotoluene	Date Collected		12/15/98			
	Date Received		12/15/98			
	Date Analyzed		12/16/98			
	Dilution Factor		1			
	% Moisture (soil)					
Target Analyte	Elution Range	Units	Result	RL	Q	
Aliphatic Hydrocarbons (1,2)	N/A		ND	100		
Aliphatic Hydrocarbons (1,3)	N/A		ND	100		
Aromatic Hydrocarbons (1)	C5-C8	ug/l	ND	5		
Aliphatic Hydrocarbons (1,2)	C5-C8	ug/l	ND	5		
Aliphatic Hydrocarbons (1,3)	C5-C8	ug/l	ND	5		
Aromatic Hydrocarbons (1)	N/A	ug/l	ND	5		
Aliphatic Hydrocarbons (1,2)	C5-C8	ug/l	ND	5		
Aliphatic Hydrocarbons (1,3)	C5-C8	ug/l	ND	5		
Aromatic Hydrocarbons (1)	N/A	ug/l	ND	100		
Aliphatic Hydrocarbons (1,2)	N/A	ug/l	ND	100		
Aliphatic Hydrocarbons (1,3)	N/A	ug/l	ND	100		
Recovery %			90			
Recovery %			82			
Acceptance Range			70-130 %			

Surrogate Range data exclude concentrations of any surrogate(s) and/or internal standards eluting in that range
Aliphatic Hydrocarbons exclude the concentration of Target Analytes eluting in that range
Aliphatic Hydrocarbons exclude conc of Target Analytes eluting in that range AND concentration of C9-C10 Aromatic Hydrocarbons
N/A indicates an estimated value

QUALIFICATION

QA/QC procedures REQUIRED by the VPH Method followed?	☒ Yes	☐ No - Details Attached
Performance/acceptance standards for required QA/QC procedures achieved?	☒ Yes	☐ No - Details Attached
Significant modifications made to the VPH method, as specified in Sect 11.37	☒ No	☐ Yes - Details Attached

Under the pains and penalties of perjury that, based upon my inquiry of those individuals immediately responsible for the information, the material contained in this report is, to the best of my knowledge and belief, accurate and

SIGNATURE: Reza Tand POSITION: Laboratory Director

PRINTED NAME: Reza Tand DATE: 01/11/99

CHAIN OF CUSTODY RECORD

Laboratory: Accutest

Project Name: VFW Parkway - W. Roxbury

Project Number: 797-159

Sampler: Daniel Jaffe

IES Staff: Daniel Jaffe

Sample Identification	Date	Time	Sample Type		Number of Containers	Analysis Requested
			Water	Soil		
B-7	12/15	A.M.	X	16459-1	1	EPH
B-8	12/15		X	-2	2	EPH
B-9	12/15		X	-3	2	EPH
~~B-10~~	~~12/15~~		~~X~~		~~2~~	~~EPH~~
~~B-11~~	~~12/15~~		~~X~~			~~EPH~~
Blank	12/15		X	-4	1	EPH
B-7	12/15		X	-5	2	VPH
B-8	12/15		X	-6	2	VPH
B-9	12/15		X	-7	2	VPH
~~B-10~~	~~12/15~~		~~X~~		~~2~~	~~VPH~~
~~B-11~~	~~12/15~~		~~X~~			~~VPH~~
Blank	12/15		X	-8	1	VPH
~~B-11~~	~~12/15~~		~~X~~			~~Dissolved Oxygen~~
B-8	12/15		X	-9	1	Dissolved Oxygen
~~B-11~~	~~12/15~~		~~X~~			~~Nitrates~~
B-8	12/15		X	-10	1	Nitrates
~~B-11~~	~~12/15~~		~~X~~			~~Total Phosphates~~
B-8	12/15		X		1	Total Phosphates
~~B-11~~	~~12/15~~		~~X~~			~~Oxygen/reduction Potential (ORP)~~
B-8	12/15		X	-12	1	Oxygen/reduction Potential (ORP)

Relinquished by: *[Signature]*

Received by: *[Signature]*

Date/Time: 12/15/97 2:00 PM

Relinquished by: *[Signature]*

Relinquished by: *[Signature]*

Date/Time

Comment: Please fax results to (617) 629-2920

- VPH & UPH Samples are preserved
- Dissolved oxygen samples are unpreserved
- Nitrate samples are unpreserved
- Total phosphate samples are unpreserved
- ORP samples are unpreserved

Technical Report for

IES, Inc.

VFW Pkwy. West. Roxbury

797-159

Accutest Job Number: M6472

Report to:

IES, Inc.
265 Medford St.
Sommerville, MA 02143

ATTN: Danneil Jaffe

Total number of pages in report: 11

/Reza Tand
Lab Director

Certifications: MA (MA136) CT (PH-0109) NH (250293) NJ (59928) RI (A-71) ME (MA136)

Results relate only to the items tested.

This report shall not be reproduced, except in its entirety, without the written approval of Accutest Laboratories.

Sample Summary

IES, Inc.

Date: 01/12/99

VFW Pkwy. West. Roxbury

Job No: M6472

Project No: 797-159

Sample Number	Collected Date	Time By	Received	Matrix Code Type	Client Sample ID
M6472-1	12/15/98	00:00 DJ	12/16/98	AQ Ground Water	B-11
M6472-2	12/15/98	00:00 DJ	12/16/98	AQ Ground Water	B-11
M6472-3	12/15/98	00:00 DJ	12/16/98	AQ Ground Water	B-11
M6472-4	12/15/98	00:00 DJ	12/16/98	AQ Ground Water	B-11
M6472-5	12/15/98	00:00 DJ	12/16/98	AQ Ground Water	B-11
M6472-6	12/15/98	00:00 DJ	12/16/98	AQ Ground Water	B-11

Report of Analysis

Page 1 of 1

Client Sample ID:	B-11		
Lab Sample ID:	M6472-1	Date Sampled:	12/15/98
Matrix:	AQ - Ground Water	Date Received:	12/16/98
Method:	MADEP EPH	Percent Solids:	n/a
Project:	VFW Pkwy. West. Roxbury		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GD19545.D	1	12/29/98	TLQ	12/22/98	OP960	GCD812
Run #2	GD19546.D	1	12/29/98	TLQ	12/22/98	OP960	GCD811

ABN Special List

CAS No.	Compound	Result	RDL	Units	Q
	C9-C18 Aliphatics	ND ^a	63	ug/l	
	C19-C36 Aliphatics	376 ^a	84	ug/l	
	C11-C22 Aromatics	479	180	ug/l	
	C11-C22 Aromatics (Unadj.)	479	180	ug/l	
83-32-9	Acenaphthene	ND	5.3	ug/l	
208-96-8	Acenaphthylene	ND	5.3	ug/l	
120-12-7	Anthracene	ND	5.3	ug/l	
56-55-3	Benzo (a) anthracene	ND	5.3	ug/l	
50-32-8	Benzo (a) pyrene	ND	5.3	ug/l	
205-99-2	Benzo (b) fluoranthene	ND	5.3	ug/l	
191-24-2	Benzo (g,h,i) perylene	ND	5.3	ug/l	
207-08-9	Benzo (k) fluoranthene	ND	5.3	ug/l	
218-01-9	Chrysene	ND	5.3	ug/l	
53-70-3	Dibenz(a,h)anthracene	ND	5.3	ug/l	
206-44-0	Fluoranthene	ND	5.3	ug/l	
86-73-7	Fluorene	ND	5.3	ug/l	
193-39-5	Indeno (1,2,3-cd) pyrene	ND	5.3	ug/l	
91-57-6	2-Methylnaphthalene	ND	5.3	ug/l	
91-20-3	Naphthalene	ND	5.3	ug/l	
85-01-8	Phenanthrene	ND	5.3	ug/l	
129-00-0	Pyrene	ND	5.3	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	40%		40-140%
321-60-8	2-Fluorobiphenyl	88%		40-140%
3386-33-2	1-Chlorooctadecane		37% ^b	40-140%
580-13-2	2-Bromonaphthalene	93%		40-140%

(a) Result is from Run# 2

(b) Verified by refractionation.

ND = Not detected

RDL = Reported Detection Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

Report of Analysis

Page 1 of 1

Client Sample ID: B-11
Lab Sample ID: M6472-2
Matrix: AQ - Ground Water
Method: MADEP VPH
Project: VFW Pkwy. West. Roxbury

Date Sampled: 12/15/98
Date Received: 12/16/98
Percent Solids: n/a

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GE14878.D	1	12/22/98	AF	n/a	n/a	GCE487
Run #2							

MA-VPH List

CAS No.	Compound	Result	RDL	Units	Q
	C5- C8 Aliphatics	ND	100	ug/l	
	C9- C12 Aliphatics	ND	100	ug/l	
	C9- C10 Aromatics	ND	100	ug/l	
	C5- C8 Aliphatics (Unadj.)	ND	100	ug/l	
	C9- C12 Aliphatics (Unadj.)	ND	100	ug/l	
71-43-2	Benzene	ND	5.0	ug/l	
100-41-4	Ethylbenzene	ND	5.0	ug/l	
1634-04-4	Methyl Tert Butyl Ether	6.0	5.0	ug/l	
91-20-3	Naphthalene	ND	5.0	ug/l	
108-88-3	Toluene	ND	5.0	ug/l	
	m,p-Xylene	ND	5.0	ug/l	
95-47-6	o-Xylene	ND	5.0	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
615-59-8	2,5-Dibromotoluene	74%		70-130%
615-59-8	2,5-Dibromotoluene	79%		70-130%

ND = Not detected
 RDL = Reported Detection Limit
 E = Indicates value exceeds calibration range

J = Indicates an estimated value
 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound

**ACCUTEST®****TEST INFORMATION**

☒ Aqueous	☐ Soil	☐ Sediment	☐ Other:
☒ Satisfactory	☐ Broken	☐ Leaking	
Preservatives: ☐ N/A	☒ pH <= 2	☐ pH > 2	☐ Comment:
Received on Ice	☐ Received at 4 deg. C	☒ Other	Rec'd at 3.5 Deg.C
Method: Water: Liquid/Liquid (SW3510C)	Soil: Sonication (SW3550B)		

ANALYTICAL RESULTS

Ranges: MADEP EPH 98-1		Client ID	B-11		
Target Analytes: MADEP EPH 98-1		Lab ID	M6472-1		
Target Standards		Date Collected	12/15/98		
1-Chlorooctadecane		Date Received	12/16/98		
o-Terphenyl		Date Extracted	12/22/98		
Surrogate Standards		Date Analyzed	12/29/98		
naphthalene		Dilution Factor	1		
Target Analyte		% Moisture (soil)			
C11-C22 Aromatics(1)		Units	Result	RL	Q
Naphthalene		ug/l	ND	5.3	
2-Methylnaphthalene		ug/l	ND	5.3	
Phenanthrene		ug/l	ND	5.3	
Acenaphthalene		ug/l	ND	5.3	
Acenaphthene		ug/l	ND	5.3	
Anthracene		ug/l	ND	5.3	
Benzo (a) anthracene		ug/l	ND	5.3	
Benzo (a) pyrene		ug/l	ND	5.3	
Benzo (b) fluoranthene		ug/l	ND	5.3	
Benzo (g,h,i) perylene		ug/l	ND	5.3	
Benzo (k) fluoranthene		ug/l	ND	5.3	
Chrysene		ug/l	ND	5.3	
Dibenz(a,h)anthracene		ug/l	ND	5.3	
Fluoranthene		ug/l	ND	5.3	
Fluorene		ug/l	ND	5.3	
Indeno (1,2,3-cd) pyrene		ug/l	ND	5.3	
Pyrene		ug/l	ND	5.3	
Aliphatic Hydrocarbons (1)		ug/l	ND	63	
Aliphatic Hydrocarbons (1)		ug/l	376	84	
Aromatic Hydrocarbons (1,2)			479	180	
Surrogate % Recovery			37		
Surrogate % Recovery			40		
Surrogate Acceptance Range			40-140 %		
Surrogate % Recovery			88		
Surrogate % Recovery			93		
Surrogate Acceptance Range			40-140 %		
n Range data exclude concentrations of any surrogate(s) and/or internal standards eluting in that range					
Aromatic Hydrocarbons exclude the concentration of Target PAH Analytes					
n indicates an estimated value					

QUALIFICATION

QC procedures REQUIRED by the EPH Method followed?	☒ Yes	☐ No	No - Details Attached
Performance/acceptance standards for required QA/QC procedures achieved?	☒ Yes	☐ No	No - Details Attached
Significant modifications made to the EPH method, as specified in Sect 11.3?	☒ No	☐ Yes	Yes - Details Attached

I, the undersigned, declare under the pains and penalties of perjury that, based upon my inquiry of those individuals immediately responsible for the collection, analysis, and reporting of the data contained in this report, the data are true, accurate, and reliable.

SIGNATURE: Reza Tand POSITION: Laboratory Director

PRINTED NAME: Reza Tand DATE: 01/12/99



ACCUTEST

GENERAL INFORMATION

☒ Aqueous	☐ Soil	☐ Sediment	☐ Other:
☒ Satisfactory	☐ Broken	☐ Leaking:	
Aqueous	☐ N/A	☒ pH <= 2	☐ pH > 2
Soil or	☐ N/A	☐ Samples NOT preserved in Methanol or air-tight container	
Sediment	☐ Samples rec'd in Methanol:	☐ covering soil	☐ not covering soil
	☐ Samples rec'd in air-tight container:		
☐ Received on Ice	☐ Rec'd at 4 Deg. C	☒ Rec'd at 3.5 Deg. C	

ANALYTICAL RESULTS

Surrogate Ranges: MADEP VPH 98-1	Client ID	B-11				
Surrogate Target Analytes: MADEP VPH 98-1	Lab ID	M6472-2				
Surrogate Standards	Date Collected	12/15/98				
2,5-Dibromotoluene	Date Received	12/16/98				
2,5-Dibromotoluene	Date Analyzed	12/22/98				
	Dilution Factor	1				
	% Moisture (soil)					
Target Analyte	Elution Range	Units	Result	RL	Q	
Aliphatic C5-C8 (1)	N/A		ND	100		
Aliphatic C9-C12 (1)	N/A		ND	100		
Aliphatic C5-C8	ug/l	ND	5			
Aliphatic C5-C8	ug/l	ND	5			
Aliphatic C5-C8	ug/l	6	5			
Aliphatic N/A	ug/l	ND	5			
Aliphatic C5-C8	ug/l	ND	5			
Aliphatic C5-C8	ug/l	ND	5			
Aliphatic C5-C8	ug/l	ND	5			
Aliphatic Hydrocarbons (1,2)	N/A	ug/l	ND	100		
Aliphatic Hydrocarbons (1,3)	N/A	ug/l	ND	100		
Aromatic Hydrocarbons (1)	N/A	ug/l	ND	100		
Surrogate % Recovery			79			
Surrogate % Recovery			74			
Acceptance Range			70-130 %			

Surrogate Range data exclude concentrations of any surrogate(s) and/or internal standards eluting in that range

Aliphatic Hydrocarbons exclude the concentration of Target Analytes eluting in that range

Aliphatic Hydrocarbons exclude conc of Target Analytes eluting in that range AND concentration of C9-C10 Aromatic Hydrocarbons

Qualifier indicates an estimated value

QUALIFICATION

QA/QC procedures REQUIRED by the VPH Method followed?	☒ Yes	☐ No - Details Attached
Performance/acceptance standards for required QA/QC procedures achieved?	☒ Yes	☐ No - Details Attached
Significant modifications made to the VPH method, as specified in Sect 11.3?	☒ No	☐ Yes - Details Attached

Under the pains and penalties of perjury that, based upon my inquiry of those individuals immediately responsible for the information, the material contained in this report is, to the best of my knowledge and belief, accurate and

SIGNATURE: Reza Tand POSITION: Laboratory Director

PRINTED NAME: Reza Tand DATE: 01/12/99

CHAIN OF CUSTODY RECORD

M6472

Laboratory: Accutest					
Project Name: VFW Parkway - W. Roxbury				Project Number: 797-159	
Sampler: Daniel Jaffe				IES Staff: Daniel Jaffe	

Sample Identification	Date	Time	Sample Type		Number of Containers	Analysis Requested
			Water	Soil		
~~B-7~~			X			EPH
~~B-8~~			X			EPH
~~B-9~~			X			EPH
~~B-10~~			X			EPH
B-11	12/15	P.M.	X	M6472-1	1 ~~2~~	EPH
~~Blank~~			X			EPH
~~B-7~~			X			VPH
~~B-8~~			X			VPH
~~B-9~~			X			VPH
~~B-10~~			X			VPH
B-11	12/15	P.M.	X	-2	2	VPH
~~Blank~~			X			VPH
B-11	12/15	P.M.	X	-3	1	Dissolved Oxygen
~~B-8~~			X			Dissolved Oxygen
B-11	12/15	P.M.	X	-4	1	Nitrates
~~B-8~~			X			Nitrates
B-11	12/15	P.M.	X	-5	1	Total Phosphates
~~B-8~~			X			Total Phosphates
B-11	12/15	P.M.	X	-6	1	Oxygen/reduction Potential (ORP)
~~Blank~~			X			Oxygen/reduction Potential (ORP)

Relinquished by: (Signature) <i>[Signature]</i>	Received by: (Signature) <i>M Abdulrahman</i>	Date/Time 12/15/15
Relinquished by: (Signature) <i>[Signature]</i>	Relinquished by: (Signature)	Date/Time

Comment: Please fax results to (617) 629-2920

Rec'd 12/15/15

12/15/15

EPH & VPH samples are preserved w/ 1:1 HCL

Dissolved oxygen samples are unpreserved

Nitrate samples are unpreserved

Total Phosphate samples contain H₂SO₄

on 12/15/15

Technical Report for

IES, Inc.

VFW Pkwy. West. Roxbury

797-159

Accutest Job Number: M6663

Report to:

IES, Inc.
265 Medford St.
Sommerville, MA 02143

ATTN: Danneil Jaffe

Total number of pages in report: 22


Reza Tand
Lab Director

Certifications: MA (MA136) CT (PH-0109) NH (250293) NJ (59928) RI (A-71) ME (MA136)
Results relate only to the items tested.

This report shall not be reproduced, except in its entirety, without the written approval of Accutest Laboratories.

Sample Summary

IES, Inc.

VFW Pkwy. West. Roxbury
Project No: 797-159

Date: 01/20/99
Job No: M6663

Sample Number	Collected Date	Time By	Received	Matrix Code Type	Client Sample ID
M6663-1	01/12/99	00:00 KA	01/13/99	AQ Ground Water	B-4
M6663-2	01/12/99	00:00 KA	01/13/99	AQ Ground Water	B-5
M6663-3	01/12/99	00:00 KA	01/13/99	AQ Ground Water	B-6
M6663-4	01/12/99	00:00 KA	01/13/99	AQ Ground Water	B-7
M6663-5	01/12/99	00:00 KA	01/13/99	AQ Ground Water	B-8
M6663-6	01/12/99	00:00 KA	01/13/99	AQ Ground Water	B-9
M6663-7	01/12/99	00:00 KA	01/13/99	AQ Ground Water	B-11
M6663-8	01/12/99	00:00 KA	01/13/99	AQ Ground Water	BLANK
M6663-9	01/12/99	00:00 KA	01/13/99	AQ Ground Water	B-4
M6663-10	01/12/99	00:00 KA	01/13/99	AQ Ground Water	B-5
M6663-11	01/12/99	00:00 KA	01/13/99	AQ Ground Water	B-6
M6663-12	01/12/99	00:00 KA	01/13/99	AQ Ground Water	B-7
M6663-13	01/12/99	00:00 KA	01/13/99	AQ Ground Water	B-8

Sample Summary

(continued)

IES, Inc.

VFW Pkwy. West. Roxbury

Project No: 797-159

Date: 01/20/99

Job No: M6663

Sample Number	Collected Date	Time By	Received	Matrix Code Type	Client Sample ID
M6663-14	01/12/99	00:00 KA	01/13/99	AQ Ground Water	B-9
M6663-15	01/12/99	00:00 KA	01/13/99	AQ Ground Water	B-11
M6663-16	01/12/99	00:00 KA	01/13/99	AQ Ground Water	BLANK

Report of Analysis

Page 1 of 1

Client Sample ID:	B-4	Date Sampled:	01/12/99
Lab Sample ID:	M6663-1	Date Received:	01/13/99
Matrix:	AQ - Ground Water	Percent Solids:	n/a
Project:	VFW Pkwy. West. Roxbury		

Metals Analysis

Analyte	Result	RDL	Units	DF	Prep	Analyzed By	Method
Arsenic	<5.0	5.0	ug/l	1	01/18/99	01/18/99 KJ	EPA 200.7
Barium	<100	100	ug/l	1	01/18/99	01/18/99 KJ	EPA 200.7
Cadmium	<4.0	4.0	ug/l	1	01/18/99	01/18/99 KJ	EPA 200.7
Chromium	<10	10	ug/l	1	01/18/99	01/18/99 KJ	EPA 200.7
Lead	<10	10	ug/l	1	01/18/99	01/18/99 KJ	EPA 200.7
Mercury	<0.50	0.50	ug/l	1	01/19/99	01/19/99 KJ	EPA 245.1
Selenium	<10	10	ug/l	1	01/18/99	01/18/99 KJ	EPA 200.7
Silver	<5.0	5.0	ug/l	1	01/18/99	01/18/99 KJ	EPA 200.7

RDL = Reported Detection Limit

Report of Analysis

Page 1 of 1

Client Sample ID:	B-5	Date Sampled:	01/12/99
Lab Sample ID:	M6663-2	Date Received:	01/13/99
Matrix:	AQ - Ground Water	Percent Solids:	n/a
Project:	VFW Pkwy. West. Roxbury		

Metals Analysis

Analyte	Result	RDL	Units	DF	Prep	Analyzed By	Method
Arsenic	<5.0	5.0	ug/l	1	01/18/99	01/18/99 KJ	EPA 200.7
Barium	<100	100	ug/l	1	01/18/99	01/18/99 KJ	EPA 200.7
Cadmium	<4.0	4.0	ug/l	1	01/18/99	01/18/99 KJ	EPA 200.7
Chromium	<10	10	ug/l	1	01/18/99	01/18/99 KJ	EPA 200.7
Lead	<10	10	ug/l	1	01/18/99	01/18/99 KJ	EPA 200.7
Mercury	<0.50	0.50	ug/l	1	01/19/99	01/19/99 KJ	EPA 245.1
Selenium	<10	10	ug/l	1	01/18/99	01/18/99 KJ	EPA 200.7
Silver	<5.0	5.0	ug/l	1	01/18/99	01/18/99 KJ	EPA 200.7

RDL = Reported Detection Limit

Report of Analysis

Page 1 of 1

Client Sample ID:	B-6	Date Sampled:	01/12/99
Lab Sample ID:	M6663-3	Date Received:	01/13/99
Matrix:	AQ - Ground Water	Percent Solids:	n/a
Project:	VFW Pkwy. West. Roxbury		

Metals Analysis

Analyte	Result	RDL	Units	DF	Prep	Analyzed By	Method
Arsenic	<5.0	5.0	ug/l	1	01/18/99	01/18/99 KJ	EPA 200.7
Barium	<100	100	ug/l	1	01/18/99	01/18/99 KJ	EPA 200.7
Cadmium	<4.0	4.0	ug/l	1	01/18/99	01/18/99 KJ	EPA 200.7
Chromium	<10	10	ug/l	1	01/18/99	01/18/99 KJ	EPA 200.7
Lead	<10	10	ug/l	1	01/18/99	01/18/99 KJ	EPA 200.7
Mercury	<0.50	0.50	ug/l	1	01/19/99	01/19/99 KJ	EPA 245.1
Selenium	<10	10	ug/l	1	01/18/99	01/18/99 KJ	EPA 200.7
Silver	<5.0	5.0	ug/l	1	01/18/99	01/18/99 KJ	EPA 200.7

RDL = Reported Detection Limit

Report of Analysis

Page 1 of 1

Client Sample ID:	B-7	Date Sampled:	01/12/99
Lab Sample ID:	M6663-4	Date Received:	01/13/99
Matrix:	AQ - Ground Water	Percent Solids:	n/a
Project:	VFW Pkwy. West. Roxbury		

Metals Analysis

Analyte	Result	RDL	Units	DF	Prep	Analyzed By	Method
Arsenic	9.3	5.0	ug/l	1	01/18/99	01/18/99 KJ	EPA 200.7
Barium	181	100	ug/l	1	01/18/99	01/18/99 KJ	EPA 200.7
Cadmium	<4.0	4.0	ug/l	1	01/18/99	01/18/99 KJ	EPA 200.7
Chromium	<10	10	ug/l	1	01/18/99	01/18/99 KJ	EPA 200.7
Lead	<10	10	ug/l	1	01/18/99	01/18/99 KJ	EPA 200.7
Mercury	<0.50	0.50	ug/l	1	01/19/99	01/19/99 KJ	EPA 245.1
Selenium	<10	10	ug/l	1	01/18/99	01/18/99 KJ	EPA 200.7
Silver	<5.0	5.0	ug/l	1	01/18/99	01/18/99 KJ	EPA 200.7

RDL = Reported Detection Limit

Report of Analysis

Page 1 of 1

Client Sample ID:	B-8	Date Sampled:	01/12/99
Lab Sample ID:	M6663-5	Date Received:	01/13/99
Matrix:	AQ - Ground Water	Percent Solids:	n/a
Project:	VFW Pkwy. West. Roxbury		

Metals Analysis

Analyte	Result	RDL	Units	DF	Prep	Analyzed By	Method
Arsenic	<5.0	5.0	ug/l	1	01/18/99	01/18/99 KJ	EPA 200.7
Barium	<100	100	ug/l	1	01/18/99	01/18/99 KJ	EPA 200.7
Cadmium	<4.0	4.0	ug/l	1	01/18/99	01/18/99 KJ	EPA 200.7
Chromium	<10	10	ug/l	1	01/18/99	01/18/99 KJ	EPA 200.7
Lead	<10	10	ug/l	1	01/18/99	01/18/99 KJ	EPA 200.7
Mercury	<0.50	0.50	ug/l	1	01/19/99	01/19/99 KJ	EPA 245.1
Selenium	<10	10	ug/l	1	01/18/99	01/18/99 KJ	EPA 200.7
Silver	<5.0	5.0	ug/l	1	01/18/99	01/18/99 KJ	EPA 200.7

RDL = Reported Detection Limit

Report of Analysis

Page 1 of 1

Client Sample ID:	B-9	Date Sampled:	01/12/99
Lab Sample ID:	M6663-6	Date Received:	01/13/99
Matrix:	AQ - Ground Water	Percent Solids:	n/a
Project:	VFW Pkwy. West. Roxbury		

Metals Analysis

Analyte	Result	RDL	Units	DF	Prep	Analyzed By	Method
Arsenic	7.9	5.0	ug/l	1	01/18/99	01/18/99 KJ	EPA 200.7
Barium	350	100	ug/l	1	01/18/99	01/18/99 KJ	EPA 200.7
Cadmium	<4.0	4.0	ug/l	1	01/18/99	01/18/99 KJ	EPA 200.7
Chromium	12.2	10	ug/l	1	01/18/99	01/18/99 KJ	EPA 200.7
Lead	70.4	10	ug/l	1	01/18/99	01/18/99 KJ	EPA 200.7
Mercury	<0.50	0.50	ug/l	1	01/19/99	01/19/99 KJ	EPA 245.1
Selenium	<10	10	ug/l	1	01/18/99	01/18/99 KJ	EPA 200.7
Silver	<5.0	5.0	ug/l	1	01/18/99	01/18/99 KJ	EPA 200.7

RDL = Reported Detection Limit

Report of Analysis

Page 1 of 1

Client Sample ID:	B-11	Date Sampled:	01/12/99
Lab Sample ID:	M6663-7	Date Received:	01/13/99
Matrix:	AQ - Ground Water	Percent Solids:	n/a
Project:	VFW Pkwy. West. Roxbury		

Metals Analysis

Analyte	Result	RDL	Units	DF	Prep	Analyzed By	Method
Arsenic	11.7	5.0	ug/l	1	01/18/99	01/18/99 KJ	EPA 200.7
Barium	129	100	ug/l	1	01/18/99	01/18/99 KJ	EPA 200.7
Cadmium	<4.0	4.0	ug/l	1	01/18/99	01/18/99 KJ	EPA 200.7
Chromium	<10	10	ug/l	1	01/18/99	01/18/99 KJ	EPA 200.7
Lead	<10	10	ug/l	1	01/18/99	01/18/99 KJ	EPA 200.7
Mercury ^a	<2.0	2.0	ug/l	2	01/20/99	01/20/99 KJ	EPA 245.1
Selenium	<10	10	ug/l	1	01/18/99	01/18/99 KJ	EPA 200.7
Silver	<5.0	5.0	ug/l	1	01/18/99	01/18/99 KJ	EPA 200.7

(a) Elevated detection limit due to dilution required for matrix interference.

RDL = Reported Detection Limit

Report of Analysis

Page 1 of 1

Client Sample ID:	BLANK	Date Sampled:	01/12/99
Lab Sample ID:	M6663-8	Date Received:	01/13/99
Matrix:	AQ - Ground Water	Percent Solids:	n/a
Project:	VFW Pkwy. West. Roxbury		

Metals Analysis

Analyte	Result	RDL	Units	DF	Prep	Analyzed By	Method
Arsenic	<5.0	5.0	ug/l	1	01/18/99	01/18/99 KJ	EPA 200.7
Barium	<100	100	ug/l	1	01/18/99	01/18/99 KJ	EPA 200.7
Cadmium	<4.0	4.0	ug/l	1	01/18/99	01/18/99 KJ	EPA 200.7
Chromium	<10	10	ug/l	1	01/18/99	01/18/99 KJ	EPA 200.7
Lead	<10	10	ug/l	1	01/18/99	01/18/99 KJ	EPA 200.7
Mercury	<0.50	0.50	ug/l	1	01/19/99	01/19/99 KJ	EPA 245.1
Selenium	<10	10	ug/l	1	01/18/99	01/18/99 KJ	EPA 200.7
Silver	<5.0	5.0	ug/l	1	01/18/99	01/18/99 KJ	EPA 200.7

RDL = Reported Detection Limit

Report of Analysis

Page 1 of 1

Client Sample ID: B-4
 Lab Sample ID: M6663-9
 Matrix: AQ - Ground Water
 Method: SW846 8260B
 Project: VFW Pkwy. West. Roxbury

Date Sampled: 01/12/99
 Date Received: 01/13/99
 Percent Solids: n/a

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	A10376.D	1	01/16/99	LHY	n/a	n/a	MSA353
Run #2							

VOA Halogenated List

CAS No.	Compound	Result	RDL	Units	Q
75-27-4	Bromodichloromethane	ND	2.0	ug/l	
75-25-2	Bromoform	ND	2.0	ug/l	
74-83-9	Bromomethane	ND	2.0	ug/l	
56-23-5	Carbon tetrachloride	ND	2.0	ug/l	
108-90-7	Chlorobenzene	ND	2.0	ug/l	
75-00-3	Chloroethane	ND	5.0	ug/l	
67-66-3	Chloroform	ND	2.0	ug/l	
74-87-3	Chloromethane	ND	5.0	ug/l	
124-48-1	Dibromochloromethane	ND	2.0	ug/l	
95-50-1	1,2-Dichlorobenzene	ND	2.0	ug/l	
541-73-1	1,3-Dichlorobenzene	ND	2.0	ug/l	
106-46-7	1,4-Dichlorobenzene	ND	2.0	ug/l	
75-71-8	Dichlorodifluoromethane	ND	2.0	ug/l	
75-34-3	1,1-Dichloroethane	ND	2.0	ug/l	
107-06-2	1,2-Dichloroethane	ND	2.0	ug/l	
75-35-4	1,1-Dichloroethene	ND	1.0	ug/l	
156-59-2	cis-1,2-Dichloroethene	ND	2.0	ug/l	
156-60-5	trans-1,2-Dichloroethene	ND	2.0	ug/l	
78-87-5	1,2-Dichloropropane	ND	2.0	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	0.50	ug/l	
10061-02-6	trans-1,3-Dichloropropene	ND	0.50	ug/l	
75-09-2	Methylene chloride	ND	5.0	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	2.0	ug/l	
127-18-4	Tetrachloroethene	ND	2.0	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	2.0	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	2.0	ug/l	
79-01-6	Trichloroethene	ND	2.0	ug/l	
75-69-4	Trichlorofluoromethane	ND	2.0	ug/l	
75-01-4	Vinyl chloride	ND	2.0	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	105%		86-118%
2037-26-5	Toluene-D8	102%		88-110%
460-00-4	4-Bromofluorobenzene	99%		80-120%

ND = Not detected

RDL = Reported Detection Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

Report of Analysis

Page 1 of 1

Client Sample ID:	B-5	Date Sampled:	01/12/99
Lab Sample ID:	M6663-10	Date Received:	01/13/99
Matrix:	AQ - Ground Water	Percent Solids:	n/a
Method:	SW846 8260B		
Project:	VFW Pkwy. West. Roxbury		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	A10375.D	1	01/16/99	LHY	n/a	n/a	MSA353
Run #2							

VOA Halogenated List

CAS No.	Compound	Result	RDL	Units	Q
75-27-4	Bromodichloromethane	ND	2.0	ug/l	
75-25-2	Bromoform	ND	2.0	ug/l	
74-83-9	Bromomethane	ND	2.0	ug/l	
56-23-5	Carbon tetrachloride	ND	2.0	ug/l	
108-90-7	Chlorobenzene	ND	2.0	ug/l	
75-00-3	Chloroethane	ND	5.0	ug/l	
67-66-3	Chloroform	ND	2.0	ug/l	
74-87-3	Chloromethane	ND	5.0	ug/l	
124-48-1	Dibromochloromethane	ND	2.0	ug/l	
95-50-1	1,2-Dichlorobenzene	ND	2.0	ug/l	
541-73-1	1,3-Dichlorobenzene	ND	2.0	ug/l	
106-46-7	1,4-Dichlorobenzene	ND	2.0	ug/l	
75-71-8	Dichlorodifluoromethane	ND	2.0	ug/l	
75-34-3	1,1-Dichloroethane	ND	2.0	ug/l	
107-06-2	1,2-Dichloroethane	ND	2.0	ug/l	
75-35-4	1,1-Dichloroethene	ND	1.0	ug/l	
156-59-2	cis-1,2-Dichloroethene	ND	2.0	ug/l	
156-60-5	trans-1,2-Dichloroethene	ND	2.0	ug/l	
78-87-5	1,2-Dichloropropane	ND	2.0	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	0.50	ug/l	
10061-02-6	trans-1,3-Dichloropropene	ND	0.50	ug/l	
75-09-2	Methylene chloride	ND	5.0	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	2.0	ug/l	
127-18-4	Tetrachloroethene	ND	2.0	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	2.0	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	2.0	ug/l	
79-01-6	Trichloroethene	ND	2.0	ug/l	
75-69-4	Trichlorofluoromethane	ND	2.0	ug/l	
75-01-4	Vinyl chloride	ND	2.0	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	108%		86-118%
2037-26-5	Toluene-D8	102%		88-110%
460-00-4	4-Bromofluorobenzene	101%		80-120%

ND = Not detected

RDL = Reported Detection Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

Report of Analysis

Page 1 of 1

Client Sample ID: B-6	
Lab Sample ID: M6663-11	Date Sampled: 01/12/99
Matrix: AQ - Ground Water	Date Received: 01/13/99
Method: SW846 8260B	Percent Solids: n/a
Project: VFW Pkwy. West. Roxbury	

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	A10374.D	1	01/16/99	LHY	n/a	n/a	MSA353
Run #2							

VOA Halogenated List

CAS No.	Compound	Result	RDL	Units	Q
75-27-4	Bromodichloromethane	ND	2.0	ug/l	
75-25-2	Bromoform	ND	2.0	ug/l	
74-83-9	Bromomethane	ND	2.0	ug/l	
56-23-5	Carbon tetrachloride	ND	2.0	ug/l	
108-90-7	Chlorobenzene	ND	2.0	ug/l	
75-00-3	Chloroethane	ND	5.0	ug/l	
67-66-3	Chloroform	ND	2.0	ug/l	
74-87-3	Chloromethane	ND	5.0	ug/l	
124-48-1	Dibromochloromethane	ND	2.0	ug/l	
95-50-1	1,2-Dichlorobenzene	ND	2.0	ug/l	
541-73-1	1,3-Dichlorobenzene	ND	2.0	ug/l	
106-46-7	1,4-Dichlorobenzene	ND	2.0	ug/l	
75-71-8	Dichlorodifluoromethane	ND	2.0	ug/l	
75-34-3	1,1-Dichloroethane	ND	2.0	ug/l	
107-06-2	1,2-Dichloroethane	ND	2.0	ug/l	
75-35-4	1,1-Dichloroethene	ND	1.0	ug/l	
156-59-2	cis-1,2-Dichloroethene	ND	2.0	ug/l	
156-60-5	trans-1,2-Dichloroethene	ND	2.0	ug/l	
78-87-5	1,2-Dichloropropane	ND	2.0	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	0.50	ug/l	
10061-02-6	trans-1,3-Dichloropropene	ND	0.50	ug/l	
75-09-2	Methylene chloride	ND	5.0	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	2.0	ug/l	
127-18-4	Tetrachloroethene	ND	2.0	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	2.0	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	2.0	ug/l	
79-01-6	Trichloroethene	ND	2.0	ug/l	
75-69-4	Trichlorofluoromethane	ND	2.0	ug/l	
75-01-4	Vinyl chloride	ND	2.0	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	113%		86-118%
2037-26-5	Toluene-D8	101%		88-110%
460-00-4	4-Bromofluorobenzene	100%		80-120%

ND = Not detected

RDL = Reported Detection Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

Report of Analysis

Page 1 of 2

Client Sample ID: B-7
Lab Sample ID: M6663-12
Matrix: AQ - Ground Water
Method: SW846 8260B
Project: VFW Pkwy. West. Roxbury

Date Sampled: 01/12/99
Date Received: 01/13/99
Percent Solids: n/a

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 ^a	A10377.D	5	01/16/99	LHY	n/a	n/a	MSA353
Run #2							

VOA Halogenated List

CAS No.	Compound	Result	RDL	Units	Q
75-27-4	Bromodichloromethane	ND	10	ug/l	
75-25-2	Bromoform	ND	10	ug/l	
74-83-9	Bromomethane	ND	10	ug/l	
56-23-5	Carbon tetrachloride	ND	10	ug/l	
108-90-7	Chlorobenzene	ND	10	ug/l	
75-00-3	Chloroethane	ND	25	ug/l	
67-66-3	Chloroform	ND	10	ug/l	
74-87-3	Chloromethane	ND	25	ug/l	
124-48-1	Dibromochloromethane	ND	10	ug/l	
95-50-1	1,2-Dichlorobenzene	ND	10	ug/l	
541-73-1	1,3-Dichlorobenzene	ND	10	ug/l	
106-46-7	1,4-Dichlorobenzene	ND	10	ug/l	
75-71-8	Dichlorodifluoromethane	ND	10	ug/l	
75-34-3	1,1-Dichloroethane	ND	10	ug/l	
107-06-2	1,2-Dichloroethane	ND	10	ug/l	
75-35-4	1,1-Dichloroethene	ND	5.0	ug/l	
156-59-2	cis-1,2-Dichloroethene	ND	10	ug/l	
156-60-5	trans-1,2-Dichloroethene	ND	10	ug/l	
78-87-5	1,2-Dichloropropane	ND	10	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	2.5	ug/l	
10061-02-6	trans-1,3-Dichloropropene	ND	2.5	ug/l	
75-09-2	Methylene chloride	ND	25	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	10	ug/l	
127-18-4	Tetrachloroethene	ND	10	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	10	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	10	ug/l	
79-01-6	Trichloroethene	ND	10	ug/l	
75-69-4	Trichlorofluoromethane	ND	10	ug/l	
75-01-4	Vinyl chloride	ND	10	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	116%		86-118%
2037-26-5	Toluene-D8	101%		88-110%
460-00-4	4-Bromofluorobenzene	104%		80-120%

ND = Not detected

RDL = Reported Detection Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

Report of Analysis

Page 2 of 2

Client Sample ID:	B-7	Date Sampled:	01/12/99
Lab Sample ID:	M6663-12	Date Received:	01/13/99
Matrix:	AQ - Ground Water	Percent Solids:	n/a
Method:	SW846 8260B		
Project:	VFW Pkwy. West. Roxbury		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 ^a	A10377.D	5	01/16/99	LHY	n/a	n/a	MSA353
Run #2							

VOA Halogenated List

CAS No.	Compound	Result	RDL	Units	Q
---------	----------	--------	-----	-------	---

(a) Dilution required due to matrix interference.

ND = Not detected
RDL = Reported Detection Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Page 1 of 1

Client Sample ID:	B-8	Date Sampled:	01/12/99
Lab Sample ID:	M6663-13	Date Received:	01/13/99
Matrix:	AQ - Ground Water	Percent Solids:	n/a
Method:	SW846 8260B		
Project:	VFW Pkwy. West. Roxbury		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	A10373.D	1	01/16/99	LHY	n/a	n/a	MSA353
Run #2							

VOA Halogenated List

CAS No.	Compound	Result	RDL	Units	Q
75-27-4	Bromodichloromethane	ND	2.0	ug/l	
75-25-2	Bromoform	ND	2.0	ug/l	
74-83-9	Bromomethane	ND	2.0	ug/l	
56-23-5	Carbon tetrachloride	ND	2.0	ug/l	
108-90-7	Chlorobenzene	ND	2.0	ug/l	
75-00-3	Chloroethane	ND	5.0	ug/l	
67-66-3	Chloroform	ND	2.0	ug/l	
74-87-3	Chloromethane	ND	5.0	ug/l	
124-48-1	Dibromochloromethane	ND	2.0	ug/l	
95-50-1	1,2-Dichlorobenzene	ND	2.0	ug/l	
541-73-1	1,3-Dichlorobenzene	ND	2.0	ug/l	
106-46-7	1,4-Dichlorobenzene	ND	2.0	ug/l	
75-71-8	Dichlorodifluoromethane	ND	2.0	ug/l	
75-34-3	1,1-Dichloroethane	ND	2.0	ug/l	
107-06-2	1,2-Dichloroethane	ND	2.0	ug/l	
75-35-4	1,1-Dichloroethene	ND	1.0	ug/l	
156-59-2	cis-1,2-Dichloroethene	ND	2.0	ug/l	
156-60-5	trans-1,2-Dichloroethene	ND	2.0	ug/l	
78-87-5	1,2-Dichloropropane	ND	2.0	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	0.50	ug/l	
10061-02-6	trans-1,3-Dichloropropene	ND	0.50	ug/l	
75-09-2	Methylene chloride	ND	5.0	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	2.0	ug/l	
127-18-4	Tetrachloroethene	ND	2.0	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	2.0	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	2.0	ug/l	
79-01-6	Trichloroethene	ND	2.0	ug/l	
75-69-4	Trichlorofluoromethane	ND	2.0	ug/l	
75-01-4	Vinyl chloride	ND	2.0	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	109%		86-118%
2037-26-5	Toluene-D8	102%		88-110%
460-00-4	4-Bromofluorobenzene	100%		80-120%

ND = Not detected

RDL = Reported Detection Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

Report of Analysis

Page 1 of 2

Client Sample ID: B-9
Lab Sample ID: M6663-14
Matrix: AQ - Ground Water
Method: SW846 8260B
Project: VFW Pkwy. West. Roxbury

Date Sampled: 01/12/99
Date Received: 01/13/99
Percent Solids: n/a

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 ^a	A10358.D	50	01/15/99	LHY	n/a	n/a	MSA353
Run #2							

VOA Halogenated List

CAS No.	Compound	Result	RDL	Units	Q
75-27-4	Bromodichloromethane	ND	100	ug/l	
75-25-2	Bromoform	ND	100	ug/l	
74-83-9	Bromomethane	ND	100	ug/l	
56-23-5	Carbon tetrachloride	ND	100	ug/l	
108-90-7	Chlorobenzene	ND	100	ug/l	
75-00-3	Chloroethane	ND	250	ug/l	
67-66-3	Chloroform	ND	100	ug/l	
74-87-3	Chloromethane	ND	250	ug/l	
124-48-1	Dibromochloromethane	ND	100	ug/l	
95-50-1	1,2-Dichlorobenzene	ND	100	ug/l	
541-73-1	1,3-Dichlorobenzene	ND	100	ug/l	
106-46-7	1,4-Dichlorobenzene	ND	100	ug/l	
75-71-8	Dichlorodifluoromethane	ND	100	ug/l	
75-34-3	1,1-Dichloroethane	ND	100	ug/l	
107-06-2	1,2-Dichloroethane	ND	100	ug/l	
75-35-4	1,1-Dichloroethene	ND	50	ug/l	
156-59-2	cis-1,2-Dichloroethene	ND	100	ug/l	
156-60-5	trans-1,2-Dichloroethene	ND	100	ug/l	
78-87-5	1,2-Dichloropropane	ND	100	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	25	ug/l	
10061-02-6	trans-1,3-Dichloropropene	ND	25	ug/l	
75-09-2	Methylene chloride	ND	100	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	100	ug/l	
127-18-4	Tetrachloroethene	ND	100	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	100	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	100	ug/l	
79-01-6	Trichloroethene	ND	100	ug/l	
75-69-4	Trichlorofluoromethane	ND	100	ug/l	
75-01-4	Vinyl chloride	ND	100	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	108%		86-118%
2037-26-5	Toluene-D8	102%		88-110%
460-00-4	4-Bromofluorobenzene	102%		80-120%

ND = Not detected

RDL = Reported Detection Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

Report of Analysis

Page 2 of 2

Client Sample ID:	B-9	Date Sampled:	01/12/99
Lab Sample ID:	M6663-14	Date Received:	01/13/99
Matrix:	AQ - Ground Water	Percent Solids:	n/a
Method:	SW846 8260B		
Project:	VFW Pkwy. West. Roxbury		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 ^a	A10358.D	50	01/15/99	LHY	n/a	n/a	MSA353
Run #2							

VOA Halogenated List

CAS No.	Compound	Result	RDL	Units	Q
---------	----------	--------	-----	-------	---

(a) Dilution required due to matrix interference.

ND = Not detected

RDL = Reported Detection Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

Report of Analysis

Page 1 of 1

Client Sample ID:	B-11	Date Sampled:	01/12/99
Lab Sample ID:	M6663-15	Date Received:	01/13/99
Matrix:	AQ - Ground Water	Percent Solids:	n/a
Method:	SW846 8260B		
Project:	VFW Pkwy. West. Roxbury		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	A10357.D	1	01/15/99	LHY	n/a	n/a	MSA353
Run #2							

VOA Halogenated List

CAS No.	Compound	Result	RDL	Units	Q
75-27-4	Bromodichloromethane	ND	2.0	ug/l	
75-25-2	Bromoform	ND	2.0	ug/l	
74-83-9	Bromomethane	ND	2.0	ug/l	
56-23-5	Carbon tetrachloride	ND	2.0	ug/l	
108-90-7	Chlorobenzene	ND	2.0	ug/l	
75-00-3	Chloroethane	ND	5.0	ug/l	
67-66-3	Chloroform	ND	2.0	ug/l	
74-87-3	Chloromethane	ND	5.0	ug/l	
124-48-1	Dibromochloromethane	ND	2.0	ug/l	
95-50-1	1,2-Dichlorobenzene	ND	2.0	ug/l	
541-73-1	1,3-Dichlorobenzene	ND	2.0	ug/l	
106-46-7	1,4-Dichlorobenzene	ND	2.0	ug/l	
75-71-8	Dichlorodifluoromethane	ND	2.0	ug/l	
75-34-3	1,1-Dichloroethane	ND	2.0	ug/l	
107-06-2	1,2-Dichloroethane	ND	2.0	ug/l	
75-35-4	1,1-Dichloroethene	ND	1.0	ug/l	
156-59-2	cis-1,2-Dichloroethene	ND	2.0	ug/l	
156-60-5	trans-1,2-Dichloroethene	ND	2.0	ug/l	
78-87-5	1,2-Dichloropropane	ND	2.0	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	0.50	ug/l	
10061-02-6	trans-1,3-Dichloropropene	ND	0.50	ug/l	
75-09-2	Methylene chloride	ND	2.0	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	2.0	ug/l	
127-18-4	Tetrachloroethene	ND	2.0	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	2.0	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	2.0	ug/l	
79-01-6	Trichloroethene	ND	2.0	ug/l	
75-69-4	Trichlorofluoromethane	ND	2.0	ug/l	
75-01-4	Vinyl chloride	ND	2.0	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	114%		86-118%
2037-26-5	Toluene-D8	99%		88-110%
460-00-4	4-Bromofluorobenzene	99%		80-120%

ND = Not detected

RDL = Reported Detection Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

Report of Analysis

Page 1 of 1

Client Sample ID:	BLANK	Date Sampled:	01/12/99
Lab Sample ID:	M6663-16	Date Received:	01/13/99
Matrix:	AQ - Ground Water	Percent Solids:	n/a
Method:	SW846 8260B		
Project:	VFW Pkwy. West. Roxbury		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	A10356.D	1	01/15/99	LHY	n/a	n/a	MSA353
Run #2							

VOA Halogenated List

CAS No.	Compound	Result	RDL	Units	Q
75-27-4	Bromodichloromethane	ND	2.0	ug/l	
75-25-2	Bromoform	ND	2.0	ug/l	
74-83-9	Bromomethane	ND	2.0	ug/l	
56-23-5	Carbon tetrachloride	ND	2.0	ug/l	
108-90-7	Chlorobenzene	ND	2.0	ug/l	
75-00-3	Chloroethane	ND	5.0	ug/l	
67-66-3	Chloroform	ND	2.0	ug/l	
74-87-3	Chloromethane	ND	5.0	ug/l	
124-48-1	Dibromochloromethane	ND	2.0	ug/l	
95-50-1	1,2-Dichlorobenzene	ND	2.0	ug/l	
541-73-1	1,3-Dichlorobenzene	ND	2.0	ug/l	
106-46-7	1,4-Dichlorobenzene	ND	2.0	ug/l	
75-71-8	Dichlorodifluoromethane	ND	2.0	ug/l	
75-34-3	1,1-Dichloroethane	ND	2.0	ug/l	
107-06-2	1,2-Dichloroethane	ND	2.0	ug/l	
75-35-4	1,1-Dichloroethene	ND	1.0	ug/l	
156-59-2	cis-1,2-Dichloroethene	ND	2.0	ug/l	
156-60-5	trans-1,2-Dichloroethene	ND	2.0	ug/l	
78-87-5	1,2-Dichloropropane	ND	2.0	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	0.50	ug/l	
10061-02-6	trans-1,3-Dichloropropene	ND	0.50	ug/l	
75-09-2	Methylene chloride	ND	2.0	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	2.0	ug/l	
127-18-4	Tetrachloroethene	ND	2.0	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	2.0	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	2.0	ug/l	
79-01-6	Trichloroethene	ND	2.0	ug/l	
75-69-4	Trichlorofluoromethane	ND	2.0	ug/l	
75-01-4	Vinyl chloride	ND	2.0	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	109%		86-118%
2037-26-5	Toluene-D8	100%		88-110%
460-00-4	4-Bromofluorobenzene	100%		80-120%

ND = Not detected

RDL = Reported Detection Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

CHAIN OF CUSTODY RECORD

M6663

Laboratory: Accutest

Project Name: VFW Parkway - W. Roxbury

Project Number: 797-159

Sampler: Kerry Asetta

IES Staff: Daniel Jaffe

Sample Identification	Date	Time	Sample Type		Number of Containers	Analysis Requested
			Water	Soil		
~~B-3~~			X			~~Dissolved RCRA 8~~
B-4 *	1/12	A.M	X	M6663-1	1	Dissolved RCRA 8
B-5	1/12	A.M	X	-2	1	Dissolved RCRA 8
B-6	1/12	A.M	X	-3	1	Dissolved RCRA 8
B-7	1/12	A.M	X	-4	1	Dissolved RCRA 8
B-8	1/12	A.M	X	-5	1	Dissolved RCRA 8
B-9	1/12	A.M	X	-6	1	Dissolved RCRA 8
B-11	1/12	A.M	X	-7	1	Dissolved RCRA 8
Blank	1/12	A.M	X	-8	1	Dissolved RCRA 8
~~B-3~~			X			~~EPA 8010~~
B-4	1/12	A.M	X	-9	2	EPA 8010
B-5	1/12	A.M	X	-10	2	EPA 8010
B-6	1/12	A.M	X	-11	2	EPA 8010
B-7	1/12	A.M	X	-12	2	EPA 8010
B-8	1/12	A.M	X	-13	2	EPA 8010
B-9	1/12	A.M	X	-14	2	EPA 8010
B-11	1/12	A.M	X	-15	2	EPA 8010
Blank	1/12	A.M	X	-16	1	EPA 8010
Relinquished by: <i>[Signature]</i>			Received by: <i>[Signature]</i>			Date/Time: 1/13/99 13:30
Relinquished by: <i>[Signature]</i>			Relinquished by: <i>[Signature]</i>			Date/Time:
Comment: Please fax results to (617) 629-2920 * Rec'd @ 3:00 PM						
Metals filtered in the field. * Add in more HNO ₃ AT LAB MA Loc: 52, 1B5						

RCRA 8 samples are preserved w/ HNO₃
 EPA 8010 samples contain no preservative

Report of Analysis

Page 1 of 1

Client Sample ID:	B-11	Date Sampled:	12/15/98
Lab Sample ID:	M6472-3	Date Received:	12/16/98
Matrix:	AQ - Ground Water	Percent Solids:	n/a
Project:	VFW Pkwy. West. Roxbury		

General Chemistry

Analyte	Result	RDL	Units	DF	Analyzed By	Method
Oxygen, Dissolved	0.45	1.0	mg/l	1	12/16/98 SAP	EPA 360.1

RDL = Reported Detection Limit

Report of Analysis

Page 1 of 1

Client Sample ID:	B-11	Date Sampled:	12/15/98
Lab Sample ID:	M6472-4	Date Received:	12/16/98
Matrix:	AQ - Ground Water	Percent Solids:	n/a
Project:	VFW Pkwy. West. Roxbury		

General Chemistry

Analyte	Result	RDL	Units	DF	Analyzed By	Method
Nitrogen, Nitrate ^a	<0.12	0.12	mg/l	1	12/22/98 HBM	EPA 353.2

(a) Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)

RDL = Reported Detection Limit

Report of Analysis

Page 1 of 1

Client Sample ID:	B-11	Date Sampled:	12/15/98
Lab Sample ID:	M6472-5	Date Received:	12/16/98
Matrix:	AQ - Ground Water	Percent Solids:	n/a
Project:	VFW Pkwy. West. Roxbury		

General Chemistry

Analyte	Result	RDL	Units	DF	Analyzed By	Method
Phosphorus, Total	70.2	5.0	mg/l	50	12/21/98 SG	EPA 365.4

RDL = Reported Detection Limit

**ACCUTEST®**

Report of Analysis

Page 1 of 1

Client Sample ID:	B-11	Date Sampled:	12/15/98
Lab Sample ID:	M6472-6	Date Received:	12/16/98
Matrix:	AQ - Ground Water	Percent Solids:	n/a
Project:	VFW Pkwy. West. Roxbury		

General Chemistry

Analyte	Result	RDL	Units	DF	Analyzed By	Method
Redox Potential Vs H ₂ ^a	392		mv	1	12/18/98 ANJ	ASTM D1498-76

(a) Analysis performed at Accutest Laboratories, Dayton, NJ. MA CERT NJ141.

RDL = Reported Detection Limit

Technical Report for

IES, Inc.

VFW Pkwy. West. Roxbury

797-159

Accutest Job Number: M6447

Report to:

IES, Inc.
265 Medford St.
Sommerville, MA 02143

ATTN: Danneil Jaffe

Total number of pages in report: 9

 Reza Tand
Lab Director

Certifications: MA (MA136) CT (PH-0109) NH (250293) NJ (59928) RI (A-71) ME (MA136)

Results relate only to the items tested.

This report shall not be reproduced, except in its entirety, without the written approval of Accutest Laboratories.

Sample Summary

IES, Inc.

VFW Pkwy. West. Roxbury
Project No: 797-159

Date: 01/15/99
Job No: M6447

Sample Number	Collected Date	Time By	Received	Matrix Code Type	Client Sample ID
M6447-1R	12/10/98	10:00 DJ	12/14/98	SO Soil	B-7/8-12'
M6447-2R	12/10/98	10:30 DJ	12/14/98	SO Soil	B-8/8-12'
M6447-3R	12/10/98	11:30 DJ	12/14/98	SO Soil	B-9/8-10'
M6447-4R	12/10/98	12:30 DJ	12/14/98	SO Soil	B-10/8-12'
M6447-5R	12/10/98	13:00 DJ	12/14/98	SO Soil	B-11/8-12'

Report of Analysis

Page 1 of 1

Client Sample ID: B-7/8-12'

Lab Sample ID: M6447-1R

Matrix: SO - Soil

Date Sampled: 12/10/98

Date Received: 12/14/98

Percent Solids: 88.3

Project: VFW Pkwy. West. Roxbury

Metals Analysis

Analyte	Result	RDL	Units	DF	Prep	Analyzed By	Method
Arsenic	1.7	1.0	mg/kg	1	01/13/99	01/13/99 KJ	SW846 6010B
Barium	48.0	10	mg/kg	1	01/13/99	01/13/99 KJ	SW846 6010B
Cadmium	<0.42	0.42	mg/kg	1	01/13/99	01/13/99 KJ	SW846 6010B
Chromium	12.8	1.0	mg/kg	1	01/13/99	01/13/99 KJ	SW846 6010B
Lead	30.2	1.0	mg/kg	1	01/13/99	01/13/99 KJ	SW846 6010B
Mercury	0.24	0.10	mg/kg	1	01/13/99	01/13/99 KJ	SW846 7471A
Selenium	<1.0	1.0	mg/kg	1	01/13/99	01/13/99 KJ	SW846 6010B
Silver	<0.53	0.53	mg/kg	1	01/13/99	01/13/99 KJ	SW846 6010B

RDL = Reported Detection Limit

Report of Analysis

Page 1 of 1

Client Sample ID: B-8/8-12'

Lab Sample ID: M6447-2R

Matrix: SO - Soil

Date Sampled: 12/10/98

Date Received: 12/14/98

Percent Solids: 87.1

Project: VFW Pkwy. West. Roxbury

Metals Analysis

Analyte	Result	RDL	Units	DF	Prep	Analyzed By	Method
Arsenic	3.7	1.1	mg/kg	1	01/13/99	01/13/99 KJ	SW846 6010B
Barium	42.8	11	mg/kg	1	01/13/99	01/13/99 KJ	SW846 6010B
Cadmium	<0.44	0.44	mg/kg	1	01/13/99	01/13/99 KJ	SW846 6010B
Chromium	22.9	1.1	mg/kg	1	01/13/99	01/13/99 KJ	SW846 6010B
Lead	13.0	1.1	mg/kg	1	01/13/99	01/13/99 KJ	SW846 6010B
Mercury	<0.11	0.11	mg/kg	1	01/13/99	01/13/99 KJ	SW846 7471A
Selenium	<1.1	1.1	mg/kg	1	01/13/99	01/13/99 KJ	SW846 6010B
Silver	<0.55	0.55	mg/kg	1	01/13/99	01/13/99 KJ	SW846 6010B

RDL = Reported Detection Limit

Report of Analysis

Page 1 of 1

Client Sample ID: B-9/8-10'

Lab Sample ID: M6447-3R

Matrix: SO - Soil

Date Sampled: 12/10/98

Date Received: 12/14/98

Percent Solids: 88.2

Project: VFW Pkwy. West. Roxbury

Metals Analysis

Analyte	Result	RDL	Units	DF	Prep	Analyzed By	Method
Arsenic	<1.0	1.0	mg/kg	1	01/13/99	01/13/99 KJ	SW846 6010B
Barium	32.3	10	mg/kg	1	01/13/99	01/13/99 KJ	SW846 6010B
Cadmium	<0.42	0.42	mg/kg	1	01/13/99	01/13/99 KJ	SW846 6010B
Chromium	5.3	1.0	mg/kg	1	01/13/99	01/13/99 KJ	SW846 6010B
Lead	13.3	1.0	mg/kg	1	01/13/99	01/13/99 KJ	SW846 6010B
Mercury	<0.11	0.11	mg/kg	1	01/13/99	01/13/99 KJ	SW846 7471A
Selenium	<1.0	1.0	mg/kg	1	01/13/99	01/13/99 KJ	SW846 6010B
Silver	<0.52	0.52	mg/kg	1	01/13/99	01/13/99 KJ	SW846 6010B

RDL = Reported Detection Limit

Report of Analysis

Page 1 of 1

Client Sample ID: B-10/8-12'

Lab Sample ID: M6447-4R

Matrix: SO - Soil

Date Sampled: 12/10/98

Date Received: 12/14/98

Percent Solids: 92.6

Project: VFW Pkwy. West. Roxbury

Metals Analysis

Analyte	Result	RDL	Units	DF	Prep	Analyzed By	Method
Arsenic	<1.0	1.0	mg/kg	1	01/13/99	01/13/99 KJ	SW846 6010B
Barium	31.4	10	mg/kg	1	01/13/99	01/13/99 KJ	SW846 6010B
Cadmium	<0.42	0.42	mg/kg	1	01/13/99	01/13/99 KJ	SW846 6010B
Chromium	3.0	1.0	mg/kg	1	01/13/99	01/13/99 KJ	SW846 6010B
Lead	27.8	1.0	mg/kg	1	01/13/99	01/13/99 KJ	SW846 6010B
Mercury	<0.10	0.10	mg/kg	1	01/13/99	01/13/99 KJ	SW846 7471A
Selenium	<1.0	1.0	mg/kg	1	01/13/99	01/13/99 KJ	SW846 6010B
Silver	<0.52	0.52	mg/kg	1	01/13/99	01/13/99 KJ	SW846 6010B

RDL = Reported Detection Limit

Report of Analysis

Page 1 of 1

Client Sample ID: B-11/8-12'

Lab Sample ID: M6447-5R

Matrix: SO - Soil

Date Sampled: 12/10/98

Date Received: 12/14/98

Percent Solids: 90.7

Project: VFW Pkwy. West. Roxbury

Metals Analysis

Analyte	Result	RDL	Units	DF	Prep	Analyzed By	Method
Arsenic	1.8	1.1	mg/kg	1	01/13/99	01/13/99 KJ	SW846 6010B
Barium	39.0	11	mg/kg	1	01/13/99	01/13/99 KJ	SW846 6010B
Cadmium	<0.44	0.44	mg/kg	1	01/13/99	01/13/99 KJ	SW846 6010B
Chromium	10.1	1.1	mg/kg	1	01/13/99	01/13/99 KJ	SW846 6010B
Lead	38.0	1.1	mg/kg	1	01/13/99	01/13/99 KJ	SW846 6010B
Mercury	<0.10	0.10	mg/kg	1	01/13/99	01/13/99 KJ	SW846 7471A
Selenium	<1.1	1.1	mg/kg	1	01/13/99	01/13/99 KJ	SW846 6010B
Silver	<0.54	0.54	mg/kg	1	01/13/99	01/13/99 KJ	SW846 6010B

RDL = Reported Detection Limit



IES, INC.

ENVIRONMENTAL CONSULTANTS

265 MEDFORD ST. • SOMERVILLE, MA 02143

(617) 623-8880 • FAX # (617) 629-2920

IESINC@AOL.COM

David P. Borans: (617) 776-8540

Cosmo D. Capobianco: (617) 623-8883

Kerry Asella: (617) 776-0578

David Brinclair: (617) 770-1950

John R. DiPietro: (617) 623-6204

Gerard R. Goguen: (617) 623-5158

Daniel G. Jaffe: (617) 776-2715

DATE SENT: January 12, 1999

SENDER'S NAME: Daniel Jaffe

NUMBER OF PAGES: This Cover and 0

NAME: Reza Tand

COMPANY NAME: Accutest

DEPARTMENT:

TELEPHONE:

FAX NUMBER: (508) 481-7753

TIME SENT: 4:45 p.m.

INSTRUCTIONS

Please run RCRA 8 Metals on soil samples identified as M6447-1 through M6447-5. Samples were collected from VFW Parkway in West Roxbury on December 10, 1998. Please fax results as soon as possible. I am also waiting on EPH results from groundwater samples obtained from that location.

IES OF CONNECTICUT: MILLION AIR • BRAINARD AIRPORT • HARTFORD, CT 06114 • (860) 724-1020

IES OF MASSACHUSETTS: 265 MEDFORD ST. • SOMERVILLE, MA 02143 • (617) 623-8880

IES OF NEW HAMPSHIRE: 480 WEST MAIN STREET • HILLSBOROUGH, NH 03244 • (603) 641-6173

IES OF NEW YORK: 10 DICKERSON AVENUE • BAYVILLE, NY 11709 • (516) 420-9518

16447

Bottle #	Empty VOA	VOA w/ 15 ml MeOH
9.9.10	26.3g	38.0g
9.9.12	26.3g	38.0g
9.9.11	26.2g	38.0g
10.1.4	25.8g	37.7g

ATTACHMENT "F"
DISPOSAL DOCUMENTS



DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF HAZARDOUS MATERIALS
One Winter Street Boston, Massachusetts 02108

Please print or type. (Form designed for use on slite (12 pitch) typewriter)

UNIFORM HAZARDOUS WASTE MANIFEST		1. Generator's US EPA ID No. MAD981074859	Manifest Document No. 22126		2. Page 1 of 1	Information in the shaded areas is not required by Federal law.	
Generator's Name and Mailing Address CLAIR MOTORS 1575 VFW PARKWAY					A. State Manifest Document Number MA K 724518		
Generator's Phone 617-325-4700 WEST ROXBURY, MA, 02132					B. State Gen. ID SAME		
Transporter 1 Company Name INOIL CORPORATION					C. State Trans. ID 15408 MA.		
Transporter 2 Company Name					D. Transporter's Phone 781-341-3108		
Designated Facility Name and Site Address INOIL CORPORATION 71 WASHINGTON ST. ROXBURY, MA 02072					E. State Trans. ID		
US DOT Description (Including Proper Shipping Name, Hazard Class and ID Number)					F. Transporter's Phone		
10. US EPA ID Number MAD082303777					G. State Facility ID NOT REQUIRED		
12. Containers					H. Facility's Phone 781-341-3108		
					13. WASTE NO.		
PETROLEUM OIL (WASTE OIL)					001 TT 1000 G MA 98		
IMBUSTIBLE LIQUID NA1270FSTL							
Additional Descriptions for Materials Listed Above (Include physical state and hazard code)					K. Handling Codes for Wastes Listed Above		
WASTE MOTOR OIL & WATER							
Special Handling Instructions and Additional Information DOT GUIDE NO. 128 HAZ. EMERGENCY NO. 1-800-622-6365							
GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.							
If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.							
Signed/Typed Name Michael J. ...					Signature [Signature]		
Transporter 1 Acknowledgement of Receipt of Materials					Date 10/01/98		
Signed/Typed Name ARLOS MARCAL					Signature [Signature]		
Transporter 2 Acknowledgement of Receipt of Materials					Date 10/01/98		
Signed/Typed Name					Signature		
Discrepancy Indication Space							
Facility Owner or Operator. Certification of receipt of hazardous materials covered by this manifest except as noted in item 19					Date		
Signed/Typed Name					Signature		
					Month Day Year		

MA K724518 COPY>B: GENERATOR RETAINS

COPY>B: GENERATOR RETAINS



COMMONWEALTH OF MASSACHUSETTS
DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF HAZARDOUS MATERIALS
One Winter Street
Boston, Massachusetts 02108

Print or type. (Form designed for use on elite (12-pitch) typewriter.)

UNIFORM HAZARDOUS WASTE MANIFEST		1. Generator US EPA ID No. MA00023037 77	Manifest Document No. 11/11/98 2456 200 203 77	2. Page 1 of 1	Information in the shaded areas is not required by Federal law.
Generator's Name and Mailing Address CHIEF, [illegible] 1575 [illegible]		[Shaded area]			
Generator's Phone (617) 523 6200					
Transporter 1 Company Name CYN OIL CORPORATION	6. US EPA ID Number MA00023037 77				
Transporter 2 Company Name	8. US EPA ID Number				
Designated Facility Name and Site Address CYN OIL CORPORATION 771 WASHINGTON STREET, P. O. BOX 119 ROUEN, MA 02072		10. US EPA ID Number MA00023037 77			
US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)		12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol
PETROLEUM OIL (WASTE OIL) combustible liquid UN 1260 1.2 III				100 TT 100/184	G
Special Handling Instructions and Additional Information ULT. EX GUIDE NO. 177 IN CASE OF EMERGENCY CALL CYN OIL CORPORATION 24 HOURS AT (800) 899-1038					
GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.					
I am a large quantity generator. I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.					
Printed/Typed Name		Signature		Date	
Transporter 1 Acknowledgement of Receipt of Materials		[Signature]		Month Day Year 11/11/98	
Printed/Typed Name		Signature		Date	
Transporter 2 Acknowledgement of Receipt of Materials		[Signature]		Month Day Year 11/11/98	
Printed/Typed Name		Signature		Date	
Discrepancy Indication Space					
Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.					
Printed/Typed Name		Signature		Date	
				Month Day Year	



Bardon Trimount

14 - 1100
11 - 2440

May 22, 1997

RICK LAMOTHE
CYN ENVIRONMENTAL
900 EAST FIRST STREET
SOUTH BOSTON, MA 02127

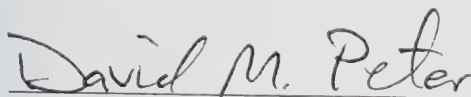
Re: Soil, Clair Motors
 1575 VFW Parkway
 Boston, MA
 Release Tracking #: 3-14019

The recyclable soil from the above address was received at our facility on May 21, 1997. Attached are the shipper's log of soil receipts which total 118.85 tons along with the Bills of Lading and other receipt documentation.

We will issue a "Certificate of Recycling" upon request after processing.

Thank you for recycling soil at our Stoughton facility.

Yours truly,



David M. Peter, Manager (PAM)
Environmental Services



Massachusetts Department of Environmental Protection **BWSC-012A**
Bureau of Waste Site Cleanup

BILL OF LADING (pursuant to 310 CMR 40.0030)

Response Tracking Number*

3 - 14019

LOCATION OF SITE OR DISPOSAL SITE WHERE REMEDIATION WASTE WAS GENERATED:

Base Name (optional): CLAIR MOTORS

et 1575 VFW Parkway

Location Aid Warrington

Town Boston

Zip Code 02132

Period of Generation: 1/1 to 1/1

Additional Release Tracking Numbers Associated with this Bill of Lading: 3-2126

*Note: If this Bill of Lading is the result of a Limited Removal Action (LRA) taken prior to Notification, a Release Tracking Number is not needed.

PERSON CONDUCTING RESPONSE ACTION ASSOCIATED WITH BILL OF LADING

Organization: CLAIR MOTORS

of Contact: RODARIO BOISVERT

Title: CLERK

1575 VFW Parkway

Town Warrington

State: MA Zip Code 02132

Phone: 617 - 725 - 1200

Ext:

RELATIONSHIP TO RELEASE OR THREAT OF RELEASE OF PERSON CONDUCTING RESPONSE ACTION ASSOCIATED WITH BILL OF LADING:

Check one/specify)

Specify (circle one) Owner Operator Generator Transporter Other RP

IP Specify (circle one): Owner Operator Generator Transporter Other PRP

Judiciary/Secured Lender

Agency/Public Utility on a Right of Way

Other Person
If owner and/or operator is not conducting the response action associated with the Bill of Lading, provide on an attachment name, contact person, address and telephone number, including any area code and extension, for each, if known.

TRANSPORTER/Common CARRIER INFORMATION:

Porter/ Common Carrier Name: CYN ENVIRONMENTAL SERVICES

ct Person: JAMES BELL & Michael O'Leary

Title: Super

900 East First Street

Town South Boston

State: MA Zip Code 02127

Phone: 617 - 464 - 6370

Ext:

RECEIVING FACILITY/TEMPORARY STORAGE LOCATION:

tor/Facility Name: BARROW TRIMMERS

ct Person: KEVIN SCULLY

Title:

1141 Tremaine St.

Town STONINGTON

State: MA Zip Code 02072

Phone: 617 - 341 - 5566

Ext:

of Facility (check one)
☒ Asphalt Batch/Cold Mix ☐ Landfill/Disposal ☐ Incinerator
☐ Asphalt Batch/Hot Mix ☐ Landfill/Daily Cover ☐ Temporary Storage
☐ Thermal Processing ☐ Landfill/Structural Fill ☐ Other:

Class A Permit #: 5-96-003 Division of Solid Waste Management Permit #:

EPA Identification # MA098123131

Anticipated Period of Temporary Storage (specify dates if applicable): 1/1 to 1/1

for Temporary Storage (if applicable):



Massachusetts Department of Environmental Protection **BWSC-012A**
Bureau of Waste Site Cleanup

BILL OF LADING (pursuant to 310 CMR 40.0030)

Response tracking Number

3 - 14019

RECEIVING FACILITY/TEMPORARY STORAGE LOCATION (continued):

Temporary Storage Address:

City/State/Zip Code

DESCRIPTION OF REMEDIATION WASTE:

(All that apply)

Contaminated Media (circle all that apply): Soil Groundwater Surface Water Other:

Contaminated Debris (circle all that apply): Demolition/Construction Waste Vegetation/Organic Material

Inorganic Absorbent Material Other:

Non-hazardous Uncontainerized Waste (circle all that apply): Non-aqueous Phase Liquid Other:

Non-hazardous Containerized Waste (circle all that apply): Tank Bottoms/Sludges Containers Drums

Engineered Impoundments Other:

Contamination (circle all that apply): Gasoline Diesel Fuel #2 Oil #4 Oil #6 Oil Waste Oil

Kerosene Jet Fuel Other:

Estimated Volume of Materials: Cubic Yards: 30 Tons: 45 Other:

Primary Source (Check one/specify) ☐ Transportation Accident ☒ Underground Storage Tank ☐ Other:

Response Action Associated with Bill of Lading (circle one) Immediate Response Action Release Abatement Measure

Utility Related Abatement Measure Limited Removal Action (LRA) Comprehensive Response Action

Other (specify):

Remediation Waste Characterization Support Documentation attached:

History Information ☒ Sampling and Analytical Methods and Procedures ☒ Laboratory Data ☒ Field Screening Data

Supporting data is not appended provide an attachment stating the date and in connection with what document such data was previously submitted to DEP

EMPLOYED SITE PROFESSIONAL (LSP) OPINION:

Organization: IFS, Inc.

Name: DANIEL JAFFE Title: Principal

Address: 265 West St.

City/State/Zip Code: Salem, MA 02147

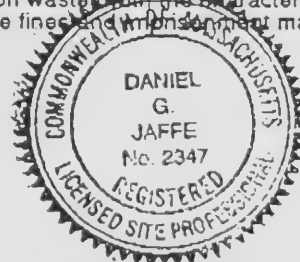
Phone: 617-776-2715

I have personally examined and am familiar with the information contained on and submitted with this form. Based on this information, I certify that the testing and assessment actions undertaken were adequate to characterize the Remediation Waste, in accordance with 310 CMR 40.0030, and that the facility or location can accept remediation wastes having the characteristics described in the submittal. I am aware that significant penalties including, but not limited to, possible fines and imprisonment may result if I submit information which I know to be false, inaccurate or materially incomplete.

Signature: [Signature] Seal:

12457

Number: 2547



CERTIFICATION OF PERSON CONDUCTING RESPONSE ACTION ASSOCIATED WITH THIS BILL OF LADING

I, the undersigned, have personally examined and am familiar with the information contained in this submittal, and all documents accompanying this certification, and that, based on my inquiry of those individuals immediately responsible for obtaining the information, the material information contained herein is, to the best of my knowledge and belief, accurate and complete. I am aware that significant penalties including, but not limited to, possible fines and imprisonment, for submitting false, inaccurate or incomplete information.

Signature: James E. Clair S.P.

Date: 5/20/97

GHTON

BARDON TRI-MOUNTAIN

Ticket Inquiry

LOCATION: 311 SToughton
CUSTOMER ORDER

CUSTOMER: 32550 CYN ENVIRONMENTAL
ORDER: 15495 1575 VFW PARKWAY

05/21/97
4 Loads
111.85 TON

TICKET	TIME	ORDER	PRODUCT	HAULER	TRUCK	QTY
3163	14:59	15495	RECY SOIL OIL	CENTRE TRU	51	31.44 TON
3100	12:34	15495	RECY SOIL OIL	CENTRE TRU	50	28.43 TON
3072	11:26	15495	RECY SOIL OIL	CENTRE TRU	51	27.96 TON
3053	10:49	15495	RECY SOIL OIL	CENTRE TRU	50	29.05 TON

1944

1944

2010

Can #50

Massachusetts Department of Environmental Protection
Bureau of Waste Site Cleanup

BWSC-0123

BILL OF LADING (pursuant to 310 CMR 40.0030)
LOG SHEET OF

Release Tracking Number:

3 - 14019

INFORMATION:

Signature of Transporter Representative:

Signature of Transporter Representative:

Time of Shipment: 10:25

Registration: 635

(circle one) am/pm

Trailer Registration (if any): 22995

Signature of Transporter Representative:

Signature of Transporter Representative:

Time of Shipment: 12:15

Registration: 635

(circle one) am/pm

Trailer Registration (if any): 22995

Signature of Transporter Representative:

Signature of Transporter Representative:

Time of Shipment:

Registration:

(circle one) am/pm

Trailer Registration (if any):

Signature of Transporter Representative:

Signature of Transporter Representative:

Time of Shipment:

Registration:

(circle one) am/pm

Trailer Registration (if any):

Signature of Transporter Representative:

Signature of Transporter Representative:

Time of Shipment:

Registration:

(circle one) am/pm

Trailer Registration (if any):

Signature of Transporter Representative:

Signature of Transporter Representative:

Time of Shipment:

Registration:

(circle one) am/pm

Trailer Registration (if any):

Signature of Transporter Representative:

Signature of Transporter Representative:

Time of Shipment:

Registration:

(circle one) am/pm

Trailer Registration (if any):

SHEET VOLUME INFORMATION:

Total Volume This Page (cu. yds./tons):

Total Carried Forward (cu. yds./tons):

Total Carried Forward and This Page (cu. yds./tons):

Receiving Facility/Temporary Storage Representative:

Date of Receipt: 5/21/99

Time of Receipt: 10:50

Load Size (cu. yds./tons): 313053

Receiving Facility/Temporary Storage Representative:

Date of Receipt: 5/21/99

Time of Receipt: 12:35

Load Size (cu. yds./tons): 313100

Receiving Facility/Temporary Storage Representative:

Date of Receipt:

Time of Receipt:

Load Size (cu. yds./tons):

Receiving Facility/Temporary Storage Representative:

Date of Receipt:

Time of Receipt:

Load Size (cu. yds./tons):

Receiving Facility/Temporary Storage Representative:

Date of Receipt:

Time of Receipt:

Load Size (cu. yds./tons):

Receiving Facility/Temporary Storage Representative:

Date of Receipt:

Time of Receipt:

Load Size (cu. yds./tons):

Receiving Facility/Temporary Storage Representative:

Date of Receipt:

Time of Receipt:

Load Size (cu. yds./tons):

Con #51



Massachusetts Department of Environmental Protection **BWSC-0123**
Bureau of Waste Site Cleanup

BILL OF LADING (pursuant to 310 CMR 40.0030)
LOG SHEET _____ **OF** _____

Release Tracking Number:

3 - 14019

SHIPMENT INFORMATION:

Signature of Transporter Representative: Charlie G. G. G.
Shipment: 1197 Time of Shipment: 9:40 : _____ (circle one) am/pm
Trailer Registration: 63 853 Trailer Registration (if any): 38 75

Receiving Facility/Temporary Storage Representative: [Signature]
Date of Receipt: 5/21/97 Time of Receipt: 11:36
313072 (circle one) am/pm
Load Size (cu. yds./tons): 27.96

Signature of Transporter Representative: [Signature]
Shipment: 1197 Time of Shipment: 2:30 : _____ (circle one) am/pm
Trailer Registration: 859 Trailer Registration (if any): 88 5

Receiving Facility/Temporary Storage Representative: [Signature]
Date of Receipt: 5/21/97 Time of Receipt: 2:00
313163 (circle one) am/pm
Load Size (cu. yds./tons): 33.44

Signature of Transporter Representative: _____
Shipment: / Time of Shipment: _____ : _____ (circle one) am/pm
Trailer Registration: _____ Trailer Registration (if any): _____

Receiving Facility/Temporary Storage Representative: _____
Date of Receipt: / / Time of Receipt: _____ : _____
Load Size (cu. yds./tons): _____ (circle one) am/pm

Signature of Transporter Representative: _____
Shipment: / Time of Shipment: _____ : _____ (circle one) am/pm
Trailer Registration: _____ Trailer Registration (if any): _____

Receiving Facility/Temporary Storage Representative: _____
Date of Receipt: / / Time of Receipt: _____ : _____
Load Size (cu. yds./tons): _____ (circle one) am/pm

Signature of Transporter Representative: _____
Shipment: / Time of Shipment: _____ : _____ (circle one) am/pm
Trailer Registration: _____ Trailer Registration (if any): _____

Receiving Facility/Temporary Storage Representative: _____
Date of Receipt: / / Time of Receipt: _____ : _____
Load Size (cu. yds./tons): _____ (circle one) am/pm

Signature of Transporter Representative: _____
Shipment: / Time of Shipment: _____ : _____ (circle one) am/pm
Trailer Registration: _____ Trailer Registration (if any): _____

Receiving Facility/Temporary Storage Representative: _____
Date of Receipt: / / Time of Receipt: _____ : _____
Load Size (cu. yds./tons): _____ (circle one) am/pm

Signature of Transporter Representative: _____
Shipment: / Time of Shipment: _____ : _____ (circle one) am/pm
Trailer Registration: _____ Trailer Registration (if any): _____

Receiving Facility/Temporary Storage Representative: _____
Date of Receipt: / / Time of Receipt: _____ : _____
Load Size (cu. yds./tons): _____ (circle one) am/pm

SHEET VOLUME INFORMATION:

Total Volume This Page (cu. yds./tons): _____

Total Carried Forward (cu. yds./tons): _____

Total Carried Forward and This Page (cu. yds./tons): _____



Massachusetts Department of Environmental Protection
Bureau of Waste Site Cleanup

BWSC-012C

BILL OF LADING (pursuant to 310 CMR 40.0030)
SUMMARY SHEET

Release Tracking Number:

3-14019

KNOWLEDGEMENT OF RECEIPT OF REMEDIATION WASTE AT RECEIVING FACILITY OR TEMPORARY STORAGE
LOCATION:

Receiving Facility/Temporary
Storage Representative (print):

David M. Peter

Title: Manager-Env. Services

Signature:

David M. Peter
(Rtm)

Date: 5/22/97

KNOWLEDGEMENT OF SHIPMENT AND RECEIPT OF REMEDIATION WASTE BY PERSON
CONDUCTING RESPONSE ACTION ASSOCIATED WITH THIS BILL OF LADING:

I certify under penalties of law that I have personally examined and am familiar with the information contained in this submittal, including any and all documents accompanying this certification, and that, based on my inquiry of those individuals immediately responsible for obtaining the information, the material information contained herein is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties, including, but not limited to, possible fines and imprisonment, for wilfully submitting false, inaccurate, or incomplete information.

Signature: _____

Date: __/__/__

Print Name (print): _____

Bardon Trimount

TICKET NO.

355614

STOUGHTON
1101 TURNPIKE STREET
STOUGHTON, MA 02072

CUSTOMER	PURCHASE ORDER NO.	PRODUCT CODE	SALE TYPE	ZONE	DATE	TIME	TRUCKER NO.	TRUCK NO.
					08/10/90	12:10		
					PLANT NO.	PROJECT NO.	LOADS	ACCUM. AMOUNT
					311	17959	3	102.29

CUSTOMER NAME	JOB NAME/DIRECTIONS
355614	10 PTD

CYN ENVIRONMENTAL
1771 WASHINGTON STREET
PO BOX 119
STOUGHTON, MA 02072

CLAIR MOTORS
VFW PKWY-W. ROXBURY
DEP#3-2126

PRODUCT	QUANTITY	UNIT	PRICE	AMOUNT	GROSS	POUNDS	TONS
REC'D SOIL OIL	28.25	TON			90000	45.40	
	TRUCKING RATE				TARE		
					34300*	17.15*	
	TAX	MAEX			56500	28.25	
	TOTAL DUE						

We relieve the seller of any liability for personal injury or property damage when delivery is made beyond the curb line.

Your business is greatly valued.

Received by:

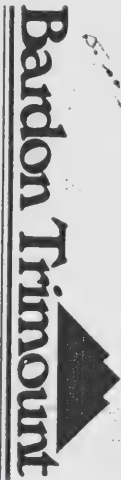
ARRIVE JOB	DEPART JOB	WAITING TIME	WEIGHTMAST

Driver: *[Signature]*

Waiting time in excess of 1/4 hour will be charged current prices.

DUCHARME TRUCKING COMPANY

02017288



TICKET NO.

355643

STOUGHTON
1101 TURNPIKE STREET
STOUGHTON, MA 02072

DATE	TIME	TRUCKER NO.	TRUCK NO.

CUSTOMER	PURCHASE ORDER NO.	PRODUCT CODE	SALE TYPE	ZONE	STAND NO.	PERMIT NO.	STANDARDS	VACUUM AMOUNT

CUSTOMER NAME	55860	JOB NAME	DIRECTIONS	311	17359	4	134.26
---------------	-------	----------	------------	-----	-------	---	--------

CYN ENVIROMENTAL
1771 WASHINGTON STREET
PO BOX 119
STOUGHTON, MA 02072

CLAIR MOTORS
UFW PKWY-W. ROXBURY
DEP#3-2126

PRODUCT	QUANTITY	UNIT	PRICE	AMOUNT	GROSS	POUNDS	TONS
REC'D SOLD GIL							
		TRUCKING RATE			98240	49.12	
		TAX			34300*	17.15*	
		TOTAL DUE			63940	31.97	

I/We relieve the seller of any liability for personal injury or property damage when delivery is made beyond the curb line.

Your business is greatly valued.

Received by:

Driver:	ARRIVE JOB	DEPART JOB	WAITING TIME	WEIGHTMASTER

Waiting time in excess of 1/4 hour will be charged at current prices



STOUGHTON
1101 TURNPIKE STREET
STOUGHTON, MA 02072

TICKET NO.	255572
------------	--------

DATE	TIME	TRUCKER NO.	TRUCK NO.
08/10/98	09:21	2401	14

CUSTOMER	PURCHASE ORDER NO.	PRODUCT CODE	SALE TYPE	ZONE	PLANT NO.	PROJECT NO.	LOADS	ACCUM. AMOUNT
32550	55060		Q P10		311	17359	1	33.28
CUSTOMER NAME					JOB NAME / DIRECTIONS			

CYN ENVIRONMENTAL
1771 WASHINGTON STREET
PO BOX 119
STOUGHTON, MA 02072

CLAIR MOTORS
VEW PKWY-W. ROXBURY
DEP#3-2126

PRODUCT	QUANTITY	UNIT	PRICE	AMOUNT	POUNDS	TONS
REC'D SOL. OIL	33.28	TUN			GROSS 00060	50.43
		TRUCKING RATE			TARE 34300*	17.15*
		TAX MAEX			NET 66560	33.28
		TOTAL DUE				

I/We relieve the seller of any liability for personal injury or property damage when delivery is made beyond the curb line.

Your business is greatly valued.

Received by:

Driver: <i>[Signature]</i>	ARRIVE JOB	DEPART JOB	WAITING TIME	WEIGHTMASTER
DUCHARME TRUCKING COMPANY				ROMMY

Waiting time in excess of 1/4 hour will be charged at current prices.

Bardon Trimount

STOUGHTON
1101 TURNPIKE STREET
STOUGHTON, MA 02072

TICKET NO. 355903

DATE	TIME	TRUCKER NO.	TRUCK NO.
08/13/98	08:00	2401	14

CUSTOMER	PURCHASE ORDER NO.	PRODUCT CODE	SALE TYPE	ZONE	PLANT NO.	PROJECT NO.	LOADS	ACCUM. AMOUNT
32550	55060		@ DEL	17959	311	17959	1	30.07
CUSTOMER NAME		JOB NAME / DIRECTIONS						

CYN ENVIRONMENTAL
1771 WASHINGTON STREET
PO BOX 119
STOUGHTON, MA 02072

SOIL/POW55060--WEST FOXBUR
SOIL/POW55060/WEST FOXBUR

PRODUCT	QUANTITY	UNIT	PRICE	AMOUNT	POUNDS	TONS
JREC SOIL OIL	30.07	TON			94440	47.22
		TRUCKING RATE				
		TAX INDEX			34300*	17.15*
		TOTAL DUE			60140	30.07

I/We relieve the seller of any liability for personal injury or property damage when delivery is made beyond the curb line.

Your business is greatly valued.

Received by:

Driver: *[Signature]*
OUCHEARNE TRUCKING COMPANY
Waiting time in excess of 1 1/4 hour will be charged at current prices

Bardon Trimount

STOUGHTON
1101 TURNPIKE STREET
STOUGHTON, MA 02072

TICKET NO.

356036

DATE	TIME	TRUCKER NO.	TRUCK NO.
08/13/90	10:30	2401	14

CUSTOMER	PURCHASE ORDER NO.	PRODUCT CODE	SALE TYPE	ZONE	PLANT NO.	PROJECT NO.	LOADS	ACCUM. AMOUNT
32550	55860		0 DEL	17959	311	17959	2	60.50

CYN ENVIRONMENTAL
1771 WASHINGTON STREET
PO BOX 119
STOUGHTON, MA 02072

JOB NAME / DIRECTIONS

SOIL/PO#55860--WEST FOXBUR
SOIL/PO#55860/WEST FOXBUR

PRODUCT	QUANTITY	UNIT	PRICE	AMOUNT	POUNDS	TONS
REC'D SOIL OIL	30.43	TON			GROSS 95160	47.58
		TRUCKING RATE			TARE 34300*	17.15*
		TAX MAEX			NET 60860	30.43
		TOTAL DUE				

I/We relieve the seller of any liability for personal injury or property damage when delivery is made beyond the curb line.

Your business is greatly valued.

Received by:

Driver: *[Signature]*
DUKEHORN TRUCKING COMPANY
Waiting time in excess of 1/4 hour will be charged at current prices.

Bardon Trimount

STOUGHTON
1101 TURNPIKE STREET
STOUGHTON, MA 02072

TICKET NO.

356077

		DATE		TIME		TRUCKER NO.		TRUCK NO.	
08/13/98		12:43		2401		14			
CUSTOMER	PURCHASE ORDER NO.	PRODUCT CODE	SALE TYPE	ZONE	PLANT NO.	PROJECT NO.	LOADS	ACCUM. AMOUNT	
32550	55060		@ DEL	17959	311	17959	3	87.15	

CYN ENVIRONMENTAL
1771 WASHINGTON STREET
PO BOX 119
STOUGHTON, MA 02072

SOIL/TONS55060-WEST ROXBUR
SOIL/PO455060/WEST ROXBUR

CUSTOMER NAME

JOB NAME / DIRECTIONS

PRODUCT	QUANTITY	UNIT	PRICE	AMOUNT		POUNDS	TONS
REC'D SOIL OIL	26.65	TON			GROSS	87600	43.80
		TRUCKING RATE			TARE	34300*	17.15*
		TAX PMEX			NET	53300	26.65
		TOTAL DUE					

I/We relieve the seller of any liability for personal injury or property damage when delivery is made beyond the curb line.

Your business is greatly valued.

Received by:

Driver: BUCHANNE TRUCKING COMPANY
Waiting time in excess of 1/4 hour will be charged at current prices.

Bardon Trimmount

1101 Turnpike Street
Stoughton, MA 02072

TICKET NO.

313100

DATE	TIME	TRUCKER NO.	TRUCK NO.
05/21/97	12:34	281	50

CUSTOMER	PURCHASE ORDER NO.	PRODUCT CODE	SALE TYPE	ZONE	PLANT NO.	PROJECT NO.	LOADS	ACCUM. AMOUNT
32550	44604	410	Q DEL	15495	311	15495	3	85.41

CUSTOMER NAME

JOB NAME / DIRECTIONS

CYN ENVIRONMENTAL
1771 WASHINGTON STREET
PO BOX 119
STOUGHTON, MA 02072

1575 VFW PARKWAY
BOSTON, MA
DEP #3-14019

PRODUCT	QUANTITY	UNIT	PRICE	AMOUNT	POUNDS	TONS
RECY SOIL OIL	28.63	TON			90950	45.48
	TRUCKING RATE				33700	* 16.85
	TAX	MAREX			57250	28.63
	TOTAL DUE					

I/We, relieve the seller of any liability for personal injury or property damage when delivery is made beyond the curb line.

Your business is greatly valued.

Received by:

[Signature]

Driver:

CENTRE TRUCKING

Waiting time in excess of 1/4 hour will be charged at current prices

J.W.

Bardon Trimmount
 1101 Turnpike Street
 Stoughton, MA 02072

TICKET NO. **313053**

DATE	TIME	TRUCKER NO.	TRUCK NO.
05/21/97	10:49	281	50

CUSTOMER	PURCHASE ORDER NO.	PRODUCT CODE	SALE TYPE	ZONE	PLANT NO.	PROJECT NO.	LOADS	ACCUM. AMOUNT
32550	44604	410	Q DEL	15495	311	15495	1	28.82

CUSTOMER NAME	JOB NAME / DIRECTIONS
CYN ENVIRONMENTAL 1771 WASHINGTON STREET PO BOX 119 STOUGHTON, MA 02072	1575 VFW PARKWAY BOSTON, MA DEP #3-14019

PRODUCT	QUANTITY	UNIT	PRICE	AMOUNT		POUNDS	TONS
RECY SOIL OIL	28.82	TON			GROSS	91340	45.67
					TRUCKING RATE		
					TARE	33700	* 16.85
					TAX MAEX		
					NET	57640	28.82
					TOTAL DUE		

I/We relieve the seller of any liability for personal injury or property damage when delivery is made beyond the curb line.	ARRIVE JOB	DEPART JOB	WAITING TIME	WEIGHTMASTER
				J.W.
Your business is greatly valued. Received by: <i>[Signature]</i>	Driver: CENTRE TRUCKING		Waiting time in excess of 1/4 hour will be charged at current prices	

Bardon Trimmount

1101 Turnpike Street
Stoughton, MA 02072

TICKET NO.

313163

CUSTOMER	PURCHASE ORDER NO.	PRODUCT CODE	SALE TYPE	ZONE	PLANT NO.	PROJECT NO.	LOADS	ACCUM. AMOUNT
30550	44604	410	10 DEL	15495	311	15495	4	118.85

CUSTOMER NAME

JOB NAME / DIRECTIONS

CYN ENVIRONMENTAL
1771 WASHINGTON STREET
PO BOX 119
STOUGHTON, MA 02072

1575 VFW PARKWAY
BOSTON, MA
DEP #3-14019

PRODUCT	QUANTITY	UNIT	PRICE	AMOUNT		POUNDS	TONS
RECY SOIL OIL	33.44	TON			GROSS	102670	51.34
		TRUCKING RATE			TARE	35800	* 17.90
		TAX	MAREX		NET	66870	33.44
		TOTAL DUE					

I/We relieve the seller of any liability for personal injury or property damage when delivery is made beyond the curb line.

Your business is greatly valued.

Received by:

ARRIVE JOB

DEPART JOB

WAITING TIME

WEIGHTMASTER

Driver:

CENTRE TRUCKING

Waiting time in excess of
1/4 hour will be charged at
current prices.

J.W.

Bardon Tramount
1101 Turnpike Street
Stoughton, MA 02072

TICKET NO. 213072

DATE	TIME	TRUCKER NO.	TRUCK NO.
05/21/97	11:36	201	51

CUSTOMER	PURCHASE ORDER NO.	PRODUCT CODE	SALE TYPE	ZONE	PLANT NO.	PROJECT NO.	LOADS	ACCUM. AMOUNT
32550	44604	410	@ DEL	15495	311	15495	3	56.78

CUSTOMER NAME	JOB NAME / DIRECTIONS
CYN ENVIROMENTAL 1771 WASHINGTON STREET PO BOX 119 STOUGHTON, MA 02072	1575 VFW PARKWAY BOSTON, MA DEP #3-14019

PRODUCT	QUANTITY	UNIT	PRICE	AMOUNT	GROSS	POUNDS	TONS
RECY SOIL OIL	27.96	TON			91720		45.86
		TRUCKING RATE			TARE	35800 *	17.90
		TAX MAEX			NET	55900	27.96
		TOTAL DUE					

We relieve the seller of any liability for personal injury or property damage when delivery is made beyond the curb line.	ARRIVE JOB	DEPART JOB	WAITING TIME	WEIGHTMASTER
				J.W.
Your business is greatly valued.	Driver: <i>Clarke</i> CENTRE TRUCKING		Waiting time in excess of 1/4 hour will be charged at current prices	

Received by: _____

CUSTOMER COPY

CONTROL NO. 2545397

STOUGHTON
1101 TURNPIKE STREET
STOUGHTON, MA 02072

STOUGHTON		TICKET NO.		355596	
1101 TURNPIKE STREET		DATE		TIME	
STOUGHTON, MA 02072		08/10/98		10:54	
PURCHASE ORDER NO.		PLANT NO.		PROJECT NO.	
55860		311		17959	
CUSTOMER NAME		ZONE		LOADS	
35550		311		2	
CUSTOMER NAME		JOB NAME / DIRECTIONS		TRUCK NO.	
55860		PIC		74-04	
CYN ENVIROMENTAL		CLAIR MOTORS		ACCUM. AMOUNT	
1771 WASHINGTON STREET		VFW PKWY-W. ROXBURY		14	
PO BOX 119		DEP#3-2126		14	
STOUGHTON, MA 02072				14	

PRODUCT	QUANTITY	UNIT	PRICE	AMOUNT	GROSS	TARE	NET	POUNDS	TONS	
RECY SOIL OIL	40.75	TON			115820			57.91		
		TRUCKING RATE						17.15*		
		TAX						42.76		
		MAEX								
		TOTAL DUE								
I/We relieve the seller of any liability for personal injury or property damage when delivery is made beyond the curb line.					WAITING TIME					WEIGHTMASTER
Your business is greatly valued.					7777777777					100000
Received by:					Driver:					Waiting time in excess of 1/4 hour will be charged at current prices
DUCHARME TRUCKING COMPANY										

CUSTOMER COPY	CONTROL NO.	0304781
(5/95) BT-25		

ATTACHMENT "G"
CONTAMINANT INFORMATION

ACENAPHTHENE

Hazardous Substances Data Bank Number: 2659

Last Revision Date: 970423

1.0 CHEMICAL AND PHYSICAL PROPERTIES

Color/Form:

WHITE NEEDLES

ORTHORHOMBIC BIPYRAMIDAL NEEDLES FROM ALCOHOL

Boiling Point: 279 DEG C AT 760 MM HG

Melting Point: 95 DEG C

Molecular Weight: 154.21

Density/Specific Gravity: 1.0242 at 90 deg C/4 deg C

Heat of Vaporization: 13,078.5 gcal/gmol

Octanol/Water Partition Coefficient: log Kow= 3.92

Solubilities:

1 G DISSOLVES IN 31 ML ALCOHOL, 56 ML METHANOL, 25 ML PROPANOL, 2.5 ML CHLOROFORM, 5 ML BENZENE OR TOLUENE

3.2 G/100 ML GLACIAL ACETIC ACID

INSOL IN WATER

Vapor Density: 5.32 (AIR= 1)

Vapor Pressure: 10 MM HG AT 131.2 DEG C

2.0 TOXICITY/BIOMEDICAL EFFECTS

HAS NO SUMMARY

3.0 ENVIRONMENTAL FATE/EXPOSURE POTENTIAL

SUMMARY

Environmental Fate/Exposure Summary:

Acenaphthene is a component of crude oil and a product of combustion which may be produced and released to the environment during natural fires. Emissions from petroleum refining, coal tar

distillation, coal combustion and diesel fueled engines are major contributors of acenaphthene to the environment. Acenaphthene is used as a chemical intermediate and may be released to the environment via manufacturing effluents and the disposal of manufacturing waste byproducts. Because of the widespread use of acenaphthene in a variety of products, acenaphthene may also be released to the environment through landfills, municipal waste water treatment facilities and waste incinerators. Acenaphthene should biodegrade rapidly in the environment. The reported biodegradation half-lives for acenaphthene in aerobic soil and surface waters range from 10 to 60 days and 1 to 25 days, respectively. However, acenaphthene may persist under anaerobic conditions or at high concn due to toxicity to micro-organisms. Acenaphthene is not expected to hydrolyze or bioconcentrate in the environment; yet, it should undergo direct photolysis in sunlit environmental media. A calculated K_{oc} range of 2065 to 3230 indicates acenaphthene will be slightly mobile in soil. In aquatic systems, acenaphthene can partition from the water column to organic matter contained in sediments and suspended solids. A Henry's Law constant of 1.55×10^{-4} atm-cu m/mole at 25 deg C suggests volatilization of acenaphthene from environmental waters may be important. The volatilization half-lives from a model river and a model pond, the latter considers the effect of adsorption, have been estimated to be 11 hr and 39 days, respectively. Acenaphthene is expected to exist entirely in the vapor-phase in ambient air. In the atmosphere, the reaction with photochemically produced hydroxyl radicals (half-life of 7.2 hr) is likely to be an important fate process. The most probable human exposure would be occupational exposure, which may occur through dermal contact or inhalation at places where acenaphthene is produced or used. Atmospheric workplace exposures have been documented. Non-occupational exposures would most likely occur via urban atmospheres, contaminated drinking water supplies and recreational contaminated waterways. (SRC)

8.0 EXPOSURE STANDARDS AND REGULATIONS

OTHER STANDARDS AND REGULATIONS

State Drinking Water Guidelines: (MN) MINNESOTA 4000 ug/l

Clean Water Act Requirements:

Toxic pollutant designated pursuant to section 307(a)(1) of the Clean Water Act and is subject to effluent limitations. /Polynuclear aromatic hydrocarbons/

CERCLA Reportable Quantities:

Persons in charge of vessels or facilities are required to notify the National Response Center (NRC) immediately, when there is a release of this designated hazardous substance, in an amount equal to or greater than its reportable quantity of 100 lb or 45.4 kg. The toll free number of the NRC is (800) 424-8802; In the Washington D C metropolitan area (202) 426-2675. The rule for determining when notification is required is stated in 40 CFR 302.4 (section IV, D.3.b).

ARSENIC

Hazardous Substances Data Bank Number: 509
Last Revision Date: 970508

1.0 CHEMICAL AND PHYSICAL PROPERTIES

Color/Form:

A SILVER-GREY BRITTLE, CRYSTALLINE, METALLIC-LOOKING SUBSTANCE
IT EXISTS IN THREE ALLOTROPIC FORMS, THE YELLOW (ALPHA), BLACK (BETA)
AND GREY (GAMMA) FORMS

HEXAGONAL, RHOMBIC, GRAY, METALLIC

Metal: Silver-gray or tin-white, brittle solid.

Odor: ODORLESS

Taste: NEARLY TASTELESS

Melting Point: 817 DEG C @ 28 ATM

Molecular Weight: 74.92

Critical Temperature and Pressure: Critical temp 1673 deg K; Critical pressure: 22.3 MPa

Density/Specific Gravity: 5.727 @ 14 DEG C

Heat of Vaporization: 11.2 KCAL/G-ATOM

Solubilities:

Sol in nitric acid; insol in water

INSOL IN CAUSTIC AND NONOXIDIZING ACIDS

mm Hg at 518 deg C; 400 mm Hg at 579 deg C

Vapor Pressure: 1 mm Hg at 372 deg C; 10 mm Hg at 437 deg C; 40 mm Hg at 483 deg C; 100

2.0 TOXICITY/BIOMEDICAL EFFECTS

SUMMARY

Evidence for Carcinogenicity:

CLASSIFICATION: A; human carcinogen. BASIS FOR CLASSIFICATION: Based on sufficient evidence from human data. An increased lung cancer mortality was observed in multiple human populations exposed primarily through inhalation. Also, increased mortality from multiple internal organ cancers (liver, kidney, lung, and bladder) and an increased incidence of skin cancer were

observed in populations consuming drinking water high in inorganic arsenic. HUMAN CARCINOGENICITY DATA: Sufficient. ANIMAL CARCINOGENICITY DATA: Inadequate. A1. A1= Confirmed human carcinogen. (1993) /Arsenic, elemental and inorganic compd (except Arsine), as As/

Classification of carcinogenicity: 1) evidence in humans: sufficient; 2) evidence in animals: limited. Overall summary evaluation of carcinogenic risk to humans is Group 1: Carcinogenic to humans. This evaluation applies to arsenic and arsenic compd as a whole and not necessarily to all individual chemicals within the group. /Arsenic and arsenic compds/

3.0 ENVIRONMENTAL FATE/EXPOSURE

ENVIRONMENTAL TRANSPORT

Bioconcentration:

Hair samples collected from common hare (*Lepus europaeus*), common vole (*Microtus arvalis*), and wood mouse (*Apodemus sylvaticus*) were subjected to instrumental neutron activation analysis (INAA). Up to 18 elements (arsenic, gold, bromine, cesium, cobalt, chromium, copper, iron, mercury, potassium, lanthanum, sodium, antimony, scandium, selenium, samarium, thorium and zinc) were detected in each hair sample. Animal hair samples from areas polluted by thermal power plants burning coal were taken and compared with hair samples from the animals living in relatively nonpolluted control areas. Animal hair samples from areas with higher levels of pollution contain usually higher concn of toxic and essential elements as As, Co, Cr, Fe, and Se. Muride rodents can be used for more detailed monitoring of environmental exposure than the hare. Moreover, the hair of the common vole shows usually highest levels of contamination as compared with the wood mouse, which could be explained by different components of feed. Animal hair was a rather sensitive indicator of environmental exposure and INAA proved to be a suitable analytical tool for this purpose.

ENVIRONMENTAL CONCENTRATIONS

Water Concentrations:

Present, background, and anthropogenic loading rates of copper, nickel, zinc, lead, cadmium, chromium, mercury, arsenic, and selenium to lake sediments were calculated, and compared to concentrations in several fishes. ... The majority of lakes had anthropogenic loadings of zinc, cadmium, mercury, and arsenic, which were presently 1.8-2.6 times background loadings. ... Enrichment by zinc, cadmium, arsenic, and especially lead was greater closer to industrialized regions. Anthropogenic and precipitation loadings for zinc, lead, cadmium, and arsenic were similar, suggesting that anthropogenic inputs are atmospheric and that current atmospheric loadings are mostly anthropogenic. ...

Pilot plant tests of two treatment methods activated alumina and ion exchange for removing arsenic from drinking water were evaluated at the Fallon, Nevada (USA), Naval Air Station. The arsenic concentration was 0.080-0.116 mg/l, exceeding the 0.05-mg/l maximum contaminant level. Although the valence of arsenic was not determined, the prechlorination process and test results suggest it was probably arsenic V. Chlorinated drinking water from the Naval Air Station was used for evaluating the efficacy of the activated alumina and ion exchange systems. The major water quality factors affecting the removal of arsenic by these methods were: pH of feedwater,

arsenic concentration, sulfate concentration, and alkalinity. The major operational factors affecting removal were: flow rate, down time, and media clogging. Capital and operating costs for arsenic removal are estimated for the activated alumina method at optimum pH (5.5) for each of the three small community systems drawing water from the same aquifer.

Atmospheric Concentrations:

Total arsenic in rural USA over 1 yr ranged from 0.0 to 0.1 ug/cu m; total As in rural Michigan over 1 yr was 0.0046 ug/cu m; ... total As in suspended particulate matter in Yellowknife NWT /Northwest Territory/ over 1 yr ranged from <0.01 to 0.01 ug/cu m.

Fish/Seafood Concentrations:

LIVERS OF FISH FROM THE GREAT LAKES CONTAIN 5.6 TO 80 PPB MAINLY IN THE FAT FRACTION. FISH GENERALLY CONTAIN LOWER ARSENIC LEVELS THAN OTHER AQUATIC ORGANISMS.

Arsenic levels in fish muscle from Abu Quir Bay ranged from 0.97 to 10.5 ppm. Levels in Tilapia muscle from Idku and Margut Lakes ranged from 0.11 to 0.18 ppm. Arsenic levels in fish livers were not consistently higher than in fish muscle.

The arsenic content of edible muscle of 2 tuna species (*Thunnus thynnus* and *Thunnus toggel*) caught in Arabian Sea waters was 2.88 and 2.51 ug/g dry wt, resp, for the 2 species. A marked increase in arsenic content was found with increasing wt of the 2 fish species.

Milk Concentrations:

Colostrum and transitional milk were obtained from 15 healthy mothers living in the Athens area /Greece/ with mean age of 26 yr. Mature milk was obtained from 5 of the 15 mothers. The concn of arsenic and some other trace metals in human milk were determined using neutron activation analysis. There were no differences between levels in human colostrum, transitional, and mature milk, all of which were about 3 ug/l (range 0.6-6.3 ug/l). /Inorganic arsenic/

HUMAN EXPOSURE

Probable Routes of Human Exposure:

Arsenic may be absorbed by ingestion, inhalation, and permeation of skin or mucous membranes. Heavy metals such as lead, arsenic, antimony, cadmium, chromium, cobalt, manganese, and mercury ... used as color pigments in paints can be ingested by contamination of hands, fingernails, food, cups, cigarettes and by holding paint brushes in the mouth.

EPA estimates that more than six million people living within 12 miles of major sources of copper, zinc, and lead smelters may be exposed to 10 times the average USA atmospheric levels of arsenic. The EPA says that 40,000 people living near some copper smelters may be exposed to 100 times the national atmospheric average. /Arsenic and arsenic compd/

Occupations with potential exposure: acetylene workers, acid dippers, alloy makers, aniline color makers, aniline workers, arsine workers, Babbit metal workers, bleaching powder makers, boiler operators, brass makers, bronze makers, bronzers, cadmium workers, cattle dip workers, ceramic enamel makers, ceramic makers, copper smelters, defoliant applicators and makers, dimethyl sulfate makers, drug makers, dye makers, electrolytic copper makers, electroplaters, enamellers, etchers, farmers, ferrosilicon workers, fertilizer makers, fireworks makers, galvanizers, glass

makers, gold extractors, gold refiners, hair remover makers, herbicide makers, hide preservers, hydrochloric acid workers, illuminating gas workers, insecticide makers, jewelers, lead burners, lead shot makers, lead smelters, leather workers, lime burners, metal cleaners, metal refiners, nitrocellulose makers, ore smelter workers, organic chemical synthesizers, paint makers, painters, paper makers, petroleum refinery workers, pigment makers, plastic workers, plumbers, printing ink workers, rayon makers, rodenticide makers, semiconductor compound makers, sheep dip workers, silver refiners, soda makers, solderers, submarine workers, sulfuric acid workers, taxidermists, textile printers, tanners, tree sprayers, type metal workers, water weed controllers, weed sprayers, wood preservative makers, wood preservers, and zinc chloride makers, etc.

/Inorganic arsenic compd/

High exposure to arsenic fumes and dust may occur in the smelting industries; the highest concn most likely occur among roaster workers. /Arsenic and arsenic compd/

Nonworker populations living near point emission sources of arsenic to air may have incr in lung cancer. ... /Arsenic and arsenic compd/

... INDUSTRIAL AND AGRICULTURAL EXPOSURE ... THE INDIVIDUALS AT GREATEST RISK ARE SMELTER WORKERS, ALTHOUGH THERE IS SOME SUGGESTION THAT WOMEN RESIDING NEAR SUCH OPERATIONS INCUR A GREATER INCIDENCE OF RESPIRATORY CANCER.

Urinary arsenic levels of residents on a downwind transect from a smelter were measured. It was found that arsenic levels decreased with distance from the smelter. Levels were 0.3 ppm at a distance of 0-0.4 miles and 0.02 ppm at a distance of 2.0-2.4 miles. Samples of vacuum cleaner dust were also collected, and arsenic was reported to decline from 1,300 ppm at a distance of 0-0.4 miles to 70 ppm at a distance of 2.0-2.4 miles. This suggests that arsenic exposure was not confined to one section of the smelter, but extended also to the surrounding community. Thus, the "non-exposed" smelter workers might also have had a degree of arsenic exposure.

The influence of physiological factors, personal habits, use of drugs, genetic disorders, acquired diseases, and pathological factors that can alter biological indicators used to assess industrial worker exposure were discussed. Physiological factors included diet, age, and sex. Consumption of crustaceans markedly increased arsenic levels in urinary arsenic.

Average Daily Intake:

Overall, the total /USA/ dietary intake of arsenic in 1975-1976 was approx 5 ug (elemental arsenic), representing an increase from the preceding years. Whether this increase represents a trend or merely reflects analytical variation in sampling from year to year is still to be determined.

Body Burdens:

Normal values of arsenic in urine ... vary from 0.013 to 0.046 mg/l, to 0.13, to 0.25. The urinary excretion in mg/l, of elements that are freely eliminated by this route, such as fluoroine, mercury, and arsenic, is at most 2.5 to 5 times the occupational exposure in mg/cu m of air.

Colostrum and transitional milk were obtained from 15 healthy mothers living in the Athens area /Greece/ with mean age of 26 yr. Mature milk was obtained from 5 of the 15 mothers. The concn of arsenic and some other trace metals in human milk were determined using neutron activation analysis. There were no differences between levels in human colostrum, transtuonal, and mature milk, all of which were about 3 ug/l (range +) 6-6.3 ug/l). /Inorganic arsenic/

HUMAN BODY BURDEN LESS THAN 100 MG/70 KG /FROM TABLE/. /INORGANIC

1

2

3

4

5

ARSENIC/

4.0 EXPOSURE STANDARDS AND REGULATIONS

STANDARDS AND REGULATIONS

Immediately Dangerous to Life or Health: NIOSH has recommended that arsenic be treated as a potential human carcinogen.

Allowable Tolerances:

Tolerances for total residues of combined arsenic (calculated as As) in food are established as follows: In edible tissues and in eggs of chickens and turkeys: 0.5 ppm in uncooked muscle tissue; 2 ppm in uncooked edible by-products; 0.5 ppm in eggs. In edible tissues of swine: 2 ppm in uncooked liver and kidney; 0.5 ppm in uncooked muscle tissue and by-products other than liver and kidney.

OCCUPATIONAL PERMISSIBLE LEVELS

OSHA Standards:

8-hr Time-Weighted avg: 5 ug/cu m. /Inorganic arsenic/

NIOSH Recommendations:

NIOSH recommends that the substance be treated as a potential human carcinogen with a 15 minute TWA: 2 ug As/cu m. /Inorganic arsenic/

NIOSH recommends that arsenic be regulated as a potential human carcinogen.

NIOSH usually recommends that occupational exposures to carcinogens be limited to the lowest feasible concn.

(15-min) Ceiling value: 0.002 mg/cu m.

Threshold Limit Values:

8 hr Time weighted Avg (TWA) 0.01 mg/cu m (1993) /Arsenic, elemental & inorganic compd (except Arsine), as As

A1. A1= Confirmed human carcinogen. (1993) /Arsenic, elemental and inorganic compd (except Arsine), as As/

BEI (Biological Exposure Index): Inorganic arsenic metabolites in urine, end of workweek 50 ug/g creatinine. The determinant is usually present in a significant amount in biological specimens collected from subjects who have not been occupationally exposed. Such background levels are included in the BEI value. /Arsenic and soluble compounds including arsine/

Other Occupational Permissible Levels:

... The following countries had adopted the ... TLV of 0.5 mg/cu m. Austria, Belgium, Finland, Japan, and Holland. Czechoslovakia, East Germany, Hungary and Poland ... USSR ... 0.3 mg/cu m; Romania and Switzerland, 0.2 mg/cu m; Sweden 0.05 mg/cu m; and Italy 0.25 mg/cu m. /Arsenic and sol compd/

BENZENE

Hazardous Substances Data Bank Number: 35

Last Revision Date: 960412

1.0 CHEMICAL AND PHYSICAL PROPERTIES

Color/Form

Benzene is a colorless liquid with a pleasant odor.

Boiling Point: 176°F

Melting Point: N/A

Solubility: Slightly soluble

Vapor Pressure: 75 mmhg at 68°F (20°C)

2.0 TOXICITY/BIOMEDICAL EFFECTS

HEALTH HAZARD INFORMATION

Acute Health Effects

The following acute (short term) health effects may occur immediately or shortly after exposure to Benzene:

- * Exposure can cause symptoms of dizziness, lightheadedness, headaches, and vomiting. Convulsions and coma, or sudden death from irregular heart beat, may follow high exposures.
- * Exposure can also irritate the eyes, nose, and throat.

Chronic Health Effects

The following chronic (long term) health effects can occur at some time after exposure to Benzene and can last for months or years:

Cancer Hazard

- * Benzene is a CARCINOGEN in humans. It has been shown to cause leukemia.
- * Many scientists believe there is no safe level of exposure to a carcinogen.

Reproductive Hazard

- * There is limited evidence that Benzene is a teratogen in animals. Until further testing has been done, it should be treated as a possible teratogen in humans.

Other Long Term Effects

- * Repeated exposure can damage the blood forming organs causing a condition called aplastic anemia. This can cause death.
- * Long term exposure may cause drying and scaling of the skin.

Toxicity:	LD50 (ORAL-RAT) (MG/KG)	4894
	LD50 (ORAL-MOUSE) (MG/KG)	4700

Carcinogenicity: NTP: Yes IARC: Yes Z List: No OSHA Reg: No

3.0 ENVIRONMENTAL FATE/EXPOSURE POTENTIAL

Benzene is used mainly in making other chemicals, as a solvent, and is found in gasoline. Benzene is produced from coal and is used to make medicinal chemicals, dyes, and many other organic compounds. It is also used to make artificial leather, linoleum, oil cloth, varnishes and lacquers. Benzene can enter the environment mostly from industrial effluents.

ACUTE (SHORT-TERM) ECOLOGICAL EFFECTS

Acute toxic effects may include the death of animals, birds, or fish, and death or low growth rate in plants. Acute effects are seen two to four days after animals or plants come in contact with a toxic chemical substance.

Benzene has high acute toxicity to aquatic life. It can cause death in plants and roots and membrane damage in leaves of various agricultural crops. No data are available on the short-term effects of benzene on birds or land animals.

CHRONIC (LONG-TERM) ECOLOGICAL EFFECTS

Chronic toxic effects may include shortened lifespan, reproductive problems, lower fertility, and changes in appearance or behavior. Chronic effects can be seen long after first exposure(s) to a toxic chemical.

Benzene has high chronic toxicity to aquatic life. No data are

available on the long-term effects of benzene on plants, birds, or land animals.

WATER SOLUBILITY

Benzene is moderately soluble in water. Concentrations of between 1 to 1,000 milligrams will mix with a liter of water.

DISTRIBUTION AND PERSISTENCE IN THE ENVIRONMENT

Benzene is slightly persistent in water, with a half-life of between 2 to 20 days. The half-life of a pollutant is the amount of time it takes for one-half of the chemical to be degraded. About 99.5% of benzene will eventually end up in air; the rest will end up in the water.

4.0 EXPOSURE STANDARDS AND REGULATIONS

OSHA: The legal airborne permissible exposure limit (PEL) is 1 ppm averaged over an 8 hour workshift, and 5 ppm which should not be exceeded in any 10 minute period.

ACGIH: The recommended airborne exposure limit is 10 ppm averaged over an 8 hour workshift.

NIOSH: The recommended airborne exposure limit is 1.0 ppm, which should not be exceeded during any 60 minute period.

- * Benzene is a **CANCER CAUSING AGENT** in humans. There may be no safe level of exposure to a carcinogen, so all contact should be reduced to the lowest possible level.
- * The above exposure limits are for air levels only. Skin contact may also cause overexposure.

ETHYL BENZENE

1.0 CHEMICAL AND PHYSICAL PROPERTIES

Color/Form

Ethyl Benzene is a colorless liquid with an aromatic odor.

Boiling Point: 277° F

Octanol/Water Partition Coefficient:

Solubility: 0.01%

Vapor Pressure: 7.1 mmhg at 68° F (20° C)

2.0 TOXICITY/BIOMEDICAL EFFECTS

SUMMARY

Acute Health Effects

The following acute (short term) health effects may occur immediately or shortly after exposure to Ethyl Benzene:

- * Ethyl Benzene can irritate the eyes, nose and throat.
- * Exposure to high concentrations can cause you to become dizzy, lightheaded and to pass out. Very high levels can cause trouble breathing, paralysis and death.
- * Contact with Ethyl Benzene can irritate the skin.

Chronic Health Effects

The following chronic (long term) health effects can occur at some time after exposure to Ethyl Benzene and can last for months or years:

Cancer Hazard

- * According to the information presently available Ethyl Benzene has not been tested for its ability to cause cancer in animals.

Reproductive Hazard

- * There is limited evidence that Ethyl Benzene may damage the

developing fetus.

Other Long Term Effects

- * Repeated contact can cause drying and scaling of the skin. Prolonged contact can cause blistering.
- * High exposure may cause liver damage.
- * This chemical has not been adequately evaluated to determine whether brain or other nerve damage could occur with repeated exposure. However, many solvents and other petroleum based chemicals have been shown to cause such damage. Effects may include reduced memory and concentration, personality changes (withdrawal, irritability), fatigue, sleep disturbances, reduced coordination, and/or effects on nerves supplying internal organs (autonomic nerves) and/or nerves to the arms and legs (weakness, "pins and needles").

3.0 ENVIRONMENTAL FATE/EXPOSURE POTENTIAL

Ethyl Benzene is used in the production of styrene and synthetic polymers, as a solvent and as a component of automotive and aviation fuels

Ethyl Benzene is a colorless, flammable liquid which is mainly used as a precursor to styrene. It is present in "mixed xylenes," which are largely derived from petroleum. Ethyl Benzene may enter the environment from petroleum-based industrial discharges or spills.

ACUTE (SHORT-TERM) ECOLOGICAL EFFECTS

Acute toxic effects may include the death of animals, birds, or fish, and death or low growth rate in plants. Acute effects are seen two to four days after animals or plants come in contact with a toxic chemical substance.

Ethyl Benzene has high acute toxicity to aquatic life. It has caused injury to various agricultural crops. Insufficient data are available to evaluate or predict the short-term effects of Ethyl Benzene to birds or land animals.

CHRONIC (LONG-TERM) ECOLOGICAL EFFECTS

Chronic toxic effects may include shortened lifespan, reproductive problems, lower fertility, and changes in appearance or behavior. Chronic effects can be seen long after first exposure(s) to a toxic chemical.

Ethyl Benzene has high chronic toxicity to aquatic life. Insufficient data are available to evaluate or predict the long-term effects of Ethyl Benzene to plants, birds, or land animals.

WATER SOLUBILITY

Ethyl Benzene is moderately soluble in water. Concentrations of between 1 to 1,000 milligrams will mix with a liter of water.

DISTRIBUTION AND PERSISTENCE IN THE ENVIRONMENT

Ethyl Benzene is non-persistent in water, with a half-life -due to volatilization - of less than 2 days. The half-life of a pollutant is the amount of time it takes for one-half of the chemical to be degraded. About 99.5% of Ethyl Benzene will eventually end up in air; the rest will end up in the water.

4.0 EXPOSURE STANDARDS AND REGULATIONS

OSHA: The legal airborne permissible exposure limit (PEL) is 100 ppm averaged over an 8 hour workshift.

ACGIH: The recommended airborne exposure limit is 100 ppm averaged over an 8 hour workshift and 125 ppm as a STEL (short term exposure limit).

- * The above exposure limits are for air levels only. When skin contact also occurs, you may be overexposed, even though air levels are less than the limits listed above.

FLUORANTHENE

Hazardous Substances Data Bank Number: 5486

Last Revision Date: 970423

1.0 CHEMICAL AND PHYSICAL PROPERTIES

Color/Form:

COLORED NEEDLES

PALE YELLOW NEEDLES OR PLATES FROM ALCOHOL

Boiling Point: ABOUT 375 DEG C

Melting Point: 111 DEG C

Molecular Weight: 202.26

Density/Specific Gravity: 1.252 AT 0 DEG C/4 DEG C

Octanol/Water Partition Coefficient: Log Kow= 4.90

Solubilities:

SOL IN ALCOHOL, ETHER, BENZENE, ACETIC ACID

Sol: in seawater at 22 deg C: 0.1 + or - 0.06 ppm, 0.120 mg/l at 24 deg C (99% purity).

/Fluoranthene/ has a high molecular weight and its relative non-polarity makes this compd very insoluble in water.

Virtually insoluble (0.20-0.26 mg/l) in water

Sol in carbon disulfide, chloroform

Soluble in >10% Et2O

Vapor Pressure: 0.01 mm Hg at 20 deg C

2.0 TOXICITY/BIOMEDICAL EFFECTS

SUMMARY

Evidence for Carcinogenicity:

CLASSIFICATION: D; not classifiable as to human carcinogenicity. BASIS FOR

CLASSIFICATION: Based on no human data and inadequate data from animal bioassays.

Report of Analysis

Page 1 of 1

Client Sample ID: B-9 Lab Sample ID: M6459-3 Matrix: AQ - Ground Water Method: MADEP EPH Project: VFW Pkwy. West. Roxbury	Date Sampled: 12/15/98 Date Received: 12/15/98 Percent Solids: n/a
--	---

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GD19764J.D	1	01/06/99	TLQ	12/22/98	OP960	GCD824
Run #2	GD19764I.D	1	01/06/99	TLQ	12/22/98	OP960	GCD823

ABN Special List

CAS No.	Compound	Result	RDL	Units	Q
	C9-C18 Aliphatics	ND ^a	63	ug/l	
	C19-C36 Aliphatics	175 ^a	84	ug/l	
	C11-C22 Aromatics	ND	180	ug/l	
	C11-C22 Aromatics (Unadj.)	ND	180	ug/l	
83-32-9	Acenaphthene	ND	5.3	ug/l	
208-96-8	Acenaphthylene	ND	5.3	ug/l	
120-12-7	Anthracene	ND	5.3	ug/l	
56-55-3	Benzo (a) anthracene	ND	5.3	ug/l	
50-32-8	Benzo (a) pyrene	ND	5.3	ug/l	
205-99-2	Benzo (b) fluoranthene	ND	5.3	ug/l	
191-24-2	Benzo (g,h,i) perylene	ND	5.3	ug/l	
207-08-9	Benzo (k) fluoranthene	ND	5.3	ug/l	
218-01-9	Chrysene	ND	5.3	ug/l	
53-70-3	Dibenz(a,h)anthracene	ND	5.3	ug/l	
206-44-0	Fluoranthene	ND	5.3	ug/l	
86-73-7	Fluorene	ND	5.3	ug/l	
193-39-5	Indeno (1,2,3-cd) pyrene	ND	5.3	ug/l	
91-57-6	2-Methylnaphthalene	ND	5.3	ug/l	
91-20-3	Naphthalene	ND	5.3	ug/l	
85-01-8	Phenanthrene	ND	5.3	ug/l	
129-00-0	Pyrene	ND	5.3	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	97%		40-140%
321-60-8	2-Fluorobiphenyl	80%		40-140%
3386-33-2	1-Chlorooctadecane		79%	40-140%
580-13-2	2-Bromonaphthalene	78%		40-140%

(a) Result is from Run# 2

ND = Not detected

RDL = Reported Detection Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

Report of Analysis

Page 1 of 1

Client Sample ID:	BLANK	Date Sampled:	12/15/98
Lab Sample ID:	M6459-4	Date Received:	12/15/98
Matrix:	AQ - Ground Water	Percent Solids:	n/a
Method:	MADEP EPH		
Project:	VFW Pkwy. West. Roxbury		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GD19513.D	1	12/25/98	TLQ	12/22/98	OP960	GCD812
Run #2	GD19514.D	1	12/25/98	TLQ	12/22/98	OP960	GCD811

ABN Special List

CAS No.	Compound	Result	RDL	Units	Q
	C9-C18 Aliphatics	ND ^a	63	ug/l	
	C19-C36 Aliphatics	ND ^a	84	ug/l	
	C11-C22 Aromatics	ND	180	ug/l	
	C11-C22 Aromatics (Unadj.)	ND	180	ug/l	
83-32-9	Acenaphthene	ND	5.3	ug/l	
208-96-8	Acenaphthylene	ND	5.3	ug/l	
120-12-7	Anthracene	ND	5.3	ug/l	
56-55-3	Benzo (a) anthracene	ND	5.3	ug/l	
50-32-8	Benzo (a) pyrene	ND	5.3	ug/l	
205-99-2	Benzo (b) fluoranthene	ND	5.3	ug/l	
191-24-2	Benzo (g,h,i) perylene	ND	5.3	ug/l	
207-08-9	Benzo (k) fluoranthene	ND	5.3	ug/l	
218-01-9	Chrysene	ND	5.3	ug/l	
53-70-3	Dibenz(a,h)anthracene	ND	5.3	ug/l	
206-44-0	Fluoranthene	ND	5.3	ug/l	
86-73-7	Fluorene	ND	5.3	ug/l	
193-39-5	Indeno (1,2,3-cd) pyrene	ND	5.3	ug/l	
91-57-6	2-Methylnaphthalene	ND	5.3	ug/l	
91-20-3	Naphthalene	ND	5.3	ug/l	
85-01-8	Phenanthrene	ND	5.3	ug/l	
129-00-0	Pyrene	ND	5.3	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	100%		40-140%
321-60-8	2-Fluorobiphenyl	94%		40-140%
3386-33-2	1-Chlorooctadecane		86%	40-140%
580-13-2	2-Bromonaphthalene	100%		40-140%

(a) Result is from Run# 2

ND = Not detected

RDL = Reported Detection Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

HUMAN CARCINOGENICITY DATA: None. ANIMAL CARCINOGENICITY DATA: Inadequate.

No data are available in humans. Inadequate evidence of carcinogenicity in animals. OVERALL EVALUATION: Group 3: The agent is not classifiable as to its carcinogenicity to humans.

A1. A1 = Confirmed human carcinogen. (1981) /Coal tar pitch volatiles, as benzene solubles/

3.0 ENVIRONMENTAL FATE/EXPOSURE POTENTIAL

SUMMARY

Environmental Fate/Exposure Summary:

Fluoranthene's release into air and water is quite general since it is a universal product of combustion of organic matter and is present in fossil fuel products. Its release is greatest in areas of high anthropogenic activity. Both in air and water it is largely associated with particulate matter. When released into water, it will rapidly become adsorbed to sediment and particulate matter in the water column, and bioconcentrate into aquatic organisms. In fact, concentrations in shellfish such as clams and mussels are an excellent indicator of pollution in a localized area. In the unadsorbed state it will degrade by photolysis (half-life days to wk). It appears to be stable in sediment for decades or more. Because it is strongly adsorbed to soil, it should remain in the upper few centimeters of the soil. However, its detection in groundwater demonstrates that it can be transported there by some process(es). It should biodegrade in a few years in the presence of acclimated microorganisms. The fluoranthene released in the atmosphere will photodegrade in the free state (half-life 4-5 days). Aerosols and particulate matter containing sorbed fluoranthene is sufficiently stable to be transported long distances while being subject to gravitational settling and rainout. Photochemical smog situations enhance the degradation of both the sorbed molecule and the free vapor. Human exposure is from ambient air and ingesting food contaminated with products of combustion or prepared in such a manner (smoking, charcoal broiling) as to generate polynuclear aromatic hydrocarbons. Exposure from drinking water is less common since water treatment such as filtration and chlorination removes fluoranthene. Distribution systems lined with coal tar or asphalt can sometimes contribute measurable amounts of fluoranthene to the drinking water. (SRC)

4.0 EXPOSURE STANDARDS AND REGULATIONS

OCCUPATIONAL PERMISSIBLE LEVELS

OSHA Standards:

[29 CFR 1910.20 (7/1/88)] Meets criteria for OSHA medical records rule. /Coal tar pitch volatiles, as benzene soluble fraction/

8 hr Time-Weighted avg: (0.2 mg/cu m). /Coal tar volatiles, as benzene soluble fraction/

NIOSH Recommendations: NIOSH recommends that fluoranthene be regulated as an occupational carcinogen. /Coal tar pitch volatiles/

OTHER STANDARDS AND REGULATIONS

State Drinking Water Guidelines: (MN) MINNESOTA 300 ug/l

Clean Water Act Requirements:

For the protection of human health from the toxic properties of fluoranthene ingested through water and contaminated aquatic organisms, the ambient water criterion is determined to be 42 ug/l.

For the protection of human health from the toxic properties of fluoranthene ingested through contaminated aquatic organisms alone, the ambient water criterion is determined to be 54 ug/l. Toxic pollutant designated pursuant to section 307(a)(1) of the Clean Water Act and is subject to effluent limitations.

CERCLA Reportable Quantities:

Persons in charge of vessels or facilities are required to notify the National Response Center (NRC) immediately, when there is a release of this designated hazardous substance, in an amount equal to or greater than its reportable quantity of 100 lb or 45.4 kg. The toll free number of the NRC is (800) 424-8802. In the Washington D.C. metropolitan area (202) 426-2675. The rule for determining when notification is required is stated in 40 CFR 302.4 (section IV. D.3.b)

RCRA Requirements:

As stipulated in 40 CFR 261.33, when fluoranthene, as a commercial chemical product or manufacturing chemical intermediate or an off-specification commercial chemical product or a manufacturing chemical intermediate, becomes a waste, it must be managed according to Federal and/or State hazardous waste regulations. Also defined as a hazardous waste is any residue, contaminated soil, water, or other debris resulting from the cleanup of a spill, into water or on dry land, of this waste. Generators of small quantities of this waste may qualify for partial exclusion from hazardous waste regulations (40 CFR 261.5).

LEAD

1.0 CHEMICAL AND PHYSICAL PROPERTIES

Color/Form

Lead is a heavy, soft ductile gray metal.

Boiling Point: 3164 ° F

Melting Point: 621°F

Octanol/Water Partition Coefficient:

Solubility: Slightly soluble

Vapor Pressure: -1.77 mm Hg at 1832oF

2.0 TOXICITY/BIOMEDICAL EFFECTS

SUMMARY

Acute Health Effects

The following acute (short-term) health effects may occur immediately or shortly after exposure to Lead:

- * Extremely high exposures could cause seizures, but usually symptoms from Lead occur after weeks to months of exposure.

Chronic Health Effects

The following chronic (long-term) health effects can occur at some time after exposure to Lead and can last for months or years:

Cancer Hazard

- * According to the information presently available, Lead has not been tested for its ability to cause cancer in animals.

Reproductive Hazard

- * Lead is a PROBABLE TERATOGEN in humans.
- * Lead may decrease fertility in males and females.

2-METHYLNAPHTHALENE

Hazardous Substances Data Bank Number: 5274

Last Revision Date: 970509

1.0 CHEMICAL AND PHYSICAL PROPERTIES

Color/Form: SOLID

Boiling Point: 241 DEG C

Melting Point: 34.6 DEG C

Molecular Weight: 142.2

Critical Temperature and Pressure: Critical temp: 761 deg K; critical pressure: 34.6 atm

Density/Specific Gravity: 1.0058 @ 20 DEG C/4 DEG C

Octanol/Water Partition Coefficient: log Kow= 3.86

Solubilities:

Very sol in alcohol & ether

Sol in benzene

Vapor Pressure: Vapor pressure= 6.81×10^{-2} mm Hg at 25 deg C

2.0 TOXICITY/BIOMEDICAL EFFECTS

TOXICITY EXCERPTS

Human Toxicity Excerpts:

In contrast to naphthalene, the only reported effects of methylated naphthalene in man are skin irritation and skin photosensitization. /methylated naphthalene/

Non-Human Toxicity Excerpts:

Exposure of the dungeness crab (c magister) larvae to seawater soln of the water sol fraction (wsf) of cook inlet crude oil showed that the concn of aromatic hydrocarbons in wsf was inversely related to the degree of alkylation in naphthalene family, but the acute toxicity of the aromatic cmpd was directly related to the degree of alkyl substitution. The seawater concn of 2-methylnaphthalene in water sol fraction of cook inlet crude oil WAS 0.03 - or - 0.001 MG/L. 2-Methylnaphthalene /admin orally at concn 5.00 mg/kg/ is lethal to /rats/.

Tobacco smoke condensates, 239 cmpd representative of the gaseous & semivolatile phase of tobacco smoke, were assayed for mutagenicity towards 4 histidine requiring mutants of

salmonella typhimurium. 1- & 2-methylnaphthalene were tested quantitatively using ta98 and ta100 with and without s9 from 3-methylcholanthrene induced rats the concn used were 3 umol/plate. 1- & 2-methylnaphthalene were not mutagenic.

3.0 ENVIRONMENTAL FATE/EXPOSURE POTENTIAL

SUMMARY

Environmental Fate/Exposure Summary:

2-Methylnaphthalene is a component of crude oil and a product of combustion which is produced and released to the environment during natural fires. Emissions from petroleum refining, coal tar distillation, and gasoline and diesel fueled engines are major contributors of 2-methylnaphthalene to the environment. Pure 2-methylnaphthalene is primarily used in vitamin K production and as a chemical intermediate. Consequently, 2-methylnaphthalene may be released to the environment via manufacturing effluents and the disposal of waste byproducts. Because of the widespread use of 2-methylnaphthalene in a variety of products, 2-methylnaphthalene is also released to the environment through landfills, municipal waste water treatment facilities and waste incinerators. 2-Methylnaphthalene should biodegrade rapidly in the environment where micro-organisms have acclimated to polycyclic aromatic hydrocarbons and at a moderate rate in unacclimated soils and aquatic systems. Hydrolysis and bioconcentration of 2-methylnaphthalene should not be an important fate processes in the environment. The direct photolysis half-life for 2-methylnaphthalene in sunlit waters at midday, midsummer and 40 deg N latitude was predicted to be 54 hr. Photolysis is also likely to occur in air and on sunlit soil surfaces. A measured K_{oc} of 8500 indicates 2-methylnaphthalene will be immobile in soil. In aquatic systems, 2-methylnaphthalene may partition from the water column to organic matter contained in sediments and suspended solids. A Henry's Law constant of 5.18×10^{-4} atm-cu m/mole at 25 deg C suggests volatilization of 2-methylnaphthalene from environmental waters may be important. The volatilization half-lives from a model river and model pond, the latter considers the effect of adsorption, have been estimated to be 5.5 hr to 77.7 days, respectively. 2-Methylnaphthalene is expected to exist entirely in the vapor phase in ambient air. Reactions with photochemically produced hydroxyl radicals (half-life of 7.4 hr) and ozone (half-life of 23.7 days) in the atmosphere are likely to be important fate processes. Nighttime reactions with dinitrogen pentoxide (half-life of 9.6 days) may contribute to the atmospheric transformation of 2-methylnaphthalene. The most probable human exposure would be occupational exposure, which may occur through dermal contact or inhalation at places where 2-methylnaphthalene is produced or used. Atmospheric workplace exposures have been documented. Non-occupational exposures would most likely occur via urban atmospheres, contaminated drinking water supplies and recreational activities at contaminated waterways. (SRC)

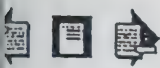
4.0 EXPOSURE STANDARDS AND REGULATIONS

OTHER STANDARDS AND REGULATIONS

Atmospheric Standards:

This action promulgates standards of performance for equipment leaks of Volatile Organic Compounds (VOC) in the Synthetic Organic Chemical Manufacturing Industry (SOCMI). The intended effect of these standards is to require all newly constructed, modified, and reconstructed

SOCMI process units to use the best demonstrated system of continuous emission reduction for equipment leaks of VOC, considering costs, non air quality health and environmental impact and energy requirements. Alkyl naphthalenes are produced, as intermediates or final products, by process units covered under this subpart. /Alkyl naphthalenes/



NAPHTHALENE

HSDB - Hazardous Substances Data Bank

CHEMICAL AND PHYSICAL PROPERTIES

Form:

- 1. WHITE, CRYSTALLINE FLAKES OR SOLID
- 2. WHITE SCALES, BALLS, POWDER OR CAKES
- 3. MONOCLINIC PLATES FROM ALCOHOL
- 4. Colorless to brown solid [Note: Shipped as a molten solid].

or:

- 1. AROMATIC ODOR
- 2. ODOR OF ... MOTH BALLS
- 3. Odor of mothballs.

Boiling Point: 217.9 DEG C @ 760 MM HG

Melting Point: 80.2 DEG C

Molecular Weight: 128.16

Reactivity: Melted naphthalene will attack some forms of plastics, rubber, and coatings.

Critical Temperature and Pressure:

- 1. CRIT TEMP: 887.4 DEG F= 475.2 DEG C= 748.4 DEG K
- 2. CRIT PRESSURE: 588 PSI= 40.0 ATM= 4.05 MEGANEWTONS/SQ M

Heat of Combustion: -16,720 BTU/LB= -9287 CAL/G= -388.8X10+5 JOULES/KG

Heat of Vaporization: 43.5 kJ/mol

Octanol/Water Partition Coefficient: log Kow= 3.30

Solubilities:

- 1. Soluble in alcohol, acetate
- 2. 1 G/3.5 ML BENZENE OR TOLUENE
- 3. 1 G/8 ML OLIVE OIL OR TURPENTINE
- 4. 1 G/2 ML CHLOROFORM OR CARBON TETRACHLORIDE
- 5. 1 G/1.2 ML CARBON DISULFIDE
- 6. VERY SOL IN ETHER, HYDRONAPHTHALENES

7. VERY SOL IN FIXED & VOLATILE OILS ✎
8. 30 MG/L IN WATER; ... VERY SOL IN 1,2-DICHLOROMETHANE ✎
9. SOL IN ETHYLENE DICHLORIDE ✎

Spectral Properties:

1. MAX ABSORPTION (ALCOHOL): 221 NM (LOG E= 5.04); 275.5 NM (LOG E= 3.76); 286 NM (LOG E= 3.59); 311 NM (LOG E= 2.38) ✎
2. SADTLER REF NUMBER: 865 (IR, PRISM); 169 (IR, GRATING) ✎
3. ULTRAVIOLET ABSORPTION: SEVERAL CHARACTERISTIC BANDS BETWEEN 217.5 & 320 NM IN HEXANE ✎
4. PURPLE FLUORESCENCE IN HG LIGHT (PETROLEUM ETHER SOLN) ✎
5. INDEX OF REFRACTION: 1.58212 AT 100 DEG C/D ✎
6. INDEX OF REFRACTION: 1.4003 @ 24 DEG C/D; 1.5898 @ 85 DEG C/D ✎
7. Intense mass spectral peaks: 128 m/z (100%), 51 m/z (13%), 129 m/z (11%), 64 m/z (11%) ✎
8. IR: 5547 (Coblentz Society Spectral Collection) ✎
9. UV: 265 (Sadtler Research Laboratories Spectral Collection) ✎
0. NMR: 62 (Sadtler Research Laboratories Prism Collection) ✎
1. MASS: 553 (Atlas of Mass Spectral Data, John Wiley & Sons, New York) ✎

Surface Tension: LIQUID SURFACE TENSION: 31.8 DYNES/CM= 0.0318 NEWTONS/M AT 100 DEG ✎

Specific Gravity: 4.42 ✎

Vapor Pressure: 0.01 kPa ✎

Relative Evaporation Rate: Much less than 1. (Butyl acetate= 1) ✎

Other Chemical/Physical Properties:

1. SUBLIMES APPRECIABLY @ TEMP ABOVE MELTING POINT ✎
2. LATENT HEAT OF VAPORIZATION: 145 BTU/LB= 80.7 CAL/G= 3.38X10+5 JOULES/KG ✎
3. Naphthalene carries two nonequivalent sets of hydrogen atoms. Therefore, two isomers of every monosubstituted naphthalene are known. ✎
4. Triple point, deg C: 80.28. Heat of fusion at triple point, kJ/mol: 18.979. ✎
5. Heat capacity (at 15.5 deg C and 101.3 kPa), J/(molxK): 159.28. Heat of formation (at 25 deg C), kJ/mol: Solid: 78.53; gas: 150.58. ✎



NAPHTHALENE

HSDB - Hazardous Substances Data Bank

0 TOXICITY/BIOMEDICAL EFFECTS

Document Outline

SUMMARY
TOXICITY EXCERPTS
TOXICITY VALUES
PHARMACOKINETICS

SUMMARY ▲

Evidence for Carcinogenicity:

CLASSIFICATION: D; not classifiable as to human carcinogenicity. BASIS FOR CLASSIFICATION: Based on no human data and inadequate data from animal bioassays. NOTE: Subsequent to the verification of this cancer assessment in 1990, the National Toxicology Program completed a two-year cancer bioassay (1991); its results suggest that naphthalene may be more appropriately classified as a possible human carcinogen (Group C under current EPA guidelines). The NTP concluded, "Under the conditions of these 2-year studies, there was no evidence of carcinogenicity activity of naphthalene in male B6C3F1 mice exposed by inhalation to concentrations of 10 or 30 ppm for 6 hours daily, 5 days per week, for 103 weeks. There was some evidence of carcinogenic activity of naphthalene in female B6C3F1 mice, as indicated by the increased incidences of pulmonary alveolar/bronchiolar adenomas." HUMAN CARCINOGENICITY DATA: None. ANIMAL CARCINOGENICITY DATA: Inadequate. ☹ ☹

Antidote and Emergency Treatment:

Gastric lavage (stomach wash), if swallowed, followed by saline catharsis. Maintain an alkaline urine. Blood transfusion if indicated. ☹ ☹

Medical Surveillance:

1. Physical examinations of exposed personnel annually, with special attention to the eyes, complete blood count, and urinalysis. ☹ ☹
2. Recommended medical surveillance: The following medical procedures should be made available to each employee who is exposed to naphthalene at potentially hazardous levels: Initial Medical



NAPHTHALENE

HSDB - Hazardous Substances Data Bank

ENVIRONMENTAL FATE/EXPOSURE POTENTIAL

Document Outline

SUMMARY
EMISSION SOURCES
ENVIRONMENTAL FATE
ENVIRONMENTAL TRANSFORMATIONS
ENVIRONMENTAL TRANSPORT
ENVIRONMENTAL CONCENTRATIONS
HUMAN EXPOSURE

SUMMARY ▲

Environmental Fate/Exposure Summary:

Naphthalene enters the atmosphere primarily from fugitive emissions and exhaust connected with its presence in fuel oil and gasoline. In addition, there are discharges on land and into water from spills during the storage, transport and disposal of fuel oil, coal tar, etc. Once in the atmosphere, naphthalene rapidly photodegrades (half-life 3-8 hr). Releases into water are lost due to volatilization, photolysis, adsorption, and biodegradation. The principal loss processes will depend on local conditions but half-lives can be expected to range from a couple of days to a few months. When adsorbed to sediment, biodegradation occurs much more rapidly than in the overlying water column. When spilled on land, naphthalene is adsorbed moderately to soil and undergoes biodegradation. However, in some cases it will appear in the groundwater where biodegradation still may occur if conditions are aerobic. Bioconcentration occurs to a moderate extent but since depuration and metabolism readily proceed in aquatic organisms, this is a short term problem. The primary source of exposure is from air, especially in areas of heavy traffic or where fumes from evaporating gasoline or fuel oil exist or in the vicinity of petroleum refineries and coal coaking operations. (SRC) &

EMISSION SOURCES ▲

Natural Occurring Sources:

Component of crude oil; since naphthalene is a natural combustion product, forest fires, etc may be a source of naphthalene. (SRC) ⚡

Official Sources:

Emissions from its production from petroleum refining and coal tar distillation(1); Emissions and wastewater from its use as a chemical intermediate(2); Motor vehicle emissions; tobacco smoke(3); coal tar pitch fumes(1); unvented kerosene space heaters(4); smoke from tire fire(5). Oil spills and leaking underground petroleum storage tanks and leaks and spills of other petroleum products(6, SRC). ⚡

Naphthalene has been identified in cigarette smoke condensate(1). ⚡

ENVIRONMENTAL FATE ▲

TERRESTRIAL FATE: The sorption of naphthalene to soil will be low to moderate depending on its organic carbon content. Its passage through sandy soil will be rapid. It will undergo biodegradation which may be rapid when the soil has been contaminated with PAHs (half-life a few hours to days) but slow otherwise (half-life > 80 days). Evaporation of naphthalene from the top soil layer will be important but the importance of the process will gradually decrease as the soil depth increases. Laboratory experiments conducted to observe the fate of naphthalene in soil columns under moderate and high flow conditions for 90 days found a decay rate of 0.1 l/day under moderate flow conditions and much lower decay rate, 0.0147 l/day, under high flow conditions(1). The naphthalene therefore degraded rapidly under moderate flow conditions and had completely disappeared from the soil column at the end of 90 days. At this time the naphthalene had advected downward approximately 1.2 m. Higher flow rates may reduce the diffusion of oxygen into the soil causing a reduction in degradation rates. When naphthalene was incubated in two sandy loam soils, at concentrations typical of those in waste disposal sites, for 48 hrs, 30% of the naphthalene was lost by volatilization(2). The biodegradation rates and half-lives for the two soils were 0.3370 and 0.3080 l/day and 2.1 and 2.2 days, respectively(2, SRC). ⚡

AQUATIC FATE: Photolysis, volatilization, biodegradation, and adsorption may all be important loss mechanisms for naphthalene discharged into water. In the Rhine River the half-life has been determined as 2.3 days based upon monitoring data(1). Moderate adsorption to sediment and particulate matter occurs. In surface layers of water, photolysis may be dominant (half-life 3 days). Volatilization is an important loss mechanism especially in rapid streams since the half-life for a river may be a couple of days. In a mesocosm experiment which simulated Narragansett Bay, the half-life in winter was 12 days; loss being primarily due to evaporation(2). These investigators did not mention any photolytic loss which would certainly have been noticed since they used sterile controls(2). In oil contaminated water which is not exposed to sunlight because the water is murky or the water depth is great, biodegradation can be important with half-lives of 7 days in oil polluted streams to a few months in coastal waters. (SRC) ⚡

ATMOSPHERIC FATE: Naphthalene reacts with photochemically produced hydroxyl radicals and degrades with a half-life of 3-8 hr(2-4). Although photolysis should occur, no data could be found to assess its importance. In polluted urban air, reaction with NO₃ radicals may be an additional sink for night time loss. An analysis of PAH concentrations and the origins of the air masses reaching the sampling site over a two week period (14 sampling events) indicates that the concentration is determined by the origin of the air mass (long distant transport)(1). Short term phenomena, such as rain events, appear to be without effect. ⚡

AQUATIC FATE: Ground water in the immediate vicinity of an area previously used for the disposal of charcoal manufacturing wastes has been shown to contain low levels of phenolic and polycyclic

compounds. Based on the analysis of samples obtained from monitoring wells, the levels of the organic contaminants are reduced to near or below the detection limit within a distance of 100 meters downgradient of the fill. Examination of the ground water chemistry indicated that the aquifer is essentially aerobic across the site, except in the immediate vicinity of the fill. At this point, dissolved oxygen is apparently depleted due to the biodegradation of organic contaminants introduced into the ground water, with a concomitant increase in the inorganic carbon concentration. Laboratory microcosm experiments demonstrated that the naturally occurring microorganisms can readily degrade a mixture of the predominant organic contaminants. Half-lives for biodegradation were in the range of 3 to 8 days for phenolic substrates, and 11 to 18 days for naphthalene. Computer model simulations indicated that the attenuation observed in the aquifer cannot be explained in terms of physical processes such as adsorption or dispersion, but is consistent with biological degradation. 68

ENVIRONMENTAL TRANSFORMATIONS ▲

degradation:

1. Polycyclic aromatic hydrocarbons with 4 or less aromatic rings are degraded by microbes and are readily metabolized by multicellular organisms ... /Polycyclic aromatic hydrocarbons/ 68 71

2. Biodegradation is probably slower in the aquatic system than in the soil, and biodegradation may be much more important in those aquatic systems which are chronically affected by contamination. /Polycyclic aromatic hydrocarbons/ 68 71

3. There is a moderate amount of data concerning the biodegradability of naphthalene both in standard biodegradability tests and in natural systems. Although there is some conflicting data, the preponderance of data suggests that naphthalene degrades after a relatively short period of acclimation and that degradation can be rapid in oil polluted water, slow in unpolluted water and that the rate of degradation increases with the concentration of naphthalene(5). In laboratory tests with sewage or sludge inoculums, 100% degradation was obtained in 7 days(1-2) while others got 0% BOD in 5 days(3-4). The lag period for naphthalene degradation decreased as groundwater was more polluted with fuel oil; the lag period was 1.2 and 1.9 days in heavily polluted and slightly polluted water, respectively versus 12 days for unpolluted water(8). Approximately 70% was lost in a pilot-scale municipal wastewater treatment plant due to biodegradation(6). In water, bacteria can utilize naphthalene only when it is in the dissolved state(7). 68 71

Twenty percent of naphthalene was degraded to CO₂ when incubated in water from an oil polluted creek(1) and rapid degradation, sometimes as fast as 95% degradation in 1.5 hr(3), have been reported in other experiments with inoculums from oil contaminated water or sediment(2). In die-away tests, reported half-lives include 70 hr in water with high PAH levels(4); 7, 24, 63, and 1700 days in an oil polluted estuarine stream, clean estuarine stream, coastal waters and in the Gulf Stream respectively(5); 9 days in water near a coal-coking wastewater discharge(6). Highest rates of mineralization in a relatively unpolluted station in Long Island Sound and the Hudson River Estuary, corrected for volatilization, were 118%/day (5.8 ug/L-day) and 172%/day (1.72 ug/L-day), respectively(10). In water from the Alaskan Continental Shelf degradation rates avg 0.5%/week; however, when nutrient levels are lower as in late spring-early summer (after algae blooms), the degradation rate is reduced(7). In a mesocosm experiment using Narragansett Bay seawater, the half-life in late summer was 0.8 days and is principally due to biodegradation(8). Biodegradation half-life 43 days in microbe-supplemented filtered Lake Superior Harbor water and 39 days in nutrient and microbe-supplemented water(9). 68 71

Degradation rates in sediment are much higher than in water, being 8-20 fold higher than in the water column above the sediment(3). Half-lives in sediment include 4.9 hr and > 88 days in oil

contaminated and uncontaminated sediment, resp(3), 9 days in sediment near a coal coaking discharge(2); and 3, 5, and > 2,000 hours in sediments with high, medium and low PAH levels respectively(1). When incubated in a slurry with sediment from an uncontaminated pond, the mineralization rate increases, reaching a peak after 6-12 days corresponding to a half life of:78 days(4). Biodegradation half-life ranged from 2.4 weeks in sediments chronically exposed to petroleum hydrocarbons to 4.4 weeks in sediment from a pristine environment(5). Naphthalene disappeared rapidly from an unacclimated agricultural soil during a 60 day period(6). Naphthalene (concn 7 mg/L) degradation was studied under various redox conditions in soil-water systems(7). It degraded to undetectable levels in 45 days, 2 wk lag, under denitrifying conditions (anaerobic with 75 mg nitrate/L(7). No significant degradation occurred in 50 days under anaerobic conditions(7). & ☐

No degradation under anaerobic conditions was observed in 6 and 11 weeks in a lab reactor with seed from a well near a source of contamination(1), or with sewage seed(2), resp, but complete degradation occurred in 8 days in gas-oil saturated groundwater which was circulated through under aerobic conditions(3). The latter case indicates that some species of ubiquitous microflora present in clean groundwater is capable of degrading naphthalene. Biodegradation occurred in groundwater contaminated with creosote(4). & ☐

This study explores the potential for a bacterial monooxygenase to remove polynuclear aromatic hydrocarbons from aqueous solutions at high rates. This is part of a larger effort to test the versatility of the cytochrome p450cam monooxygenase enzyme system for detoxification of industrial process wastewaters that contain trace quantities of hazardous compounds like PAHs or halocarbons. The intracellular concentration of p450cam in washed, resting cells suspensions of *Pseudomonas putida* PpG 786 that were cultured on camphor was measured by adapting a spectrophotometric method used to measure p450 concentration in extracts of mammalian tissue. Naphthalene removal in the suspensions was measured as a function of incubation time, biomass concentration, starting naphthalene concentration, starting naphthalene concentration ((3-180 $\mu\text{mol/l}$) and in the presence of known p450 inhibitors. Involvement of the p450cam system in the measured naphthalene disappearance was established by showing that while significant naphthalene removal occurred in camphor-grown biomass, no disappearance was observed in glutamate-grown biomass and that removal was turned off in the presence of the p450 inhibitor metyrapone. The half-life of naphthalene removed decreased rapidly as initial naphthalene concentration increased, and essentially no naphthalene was removed when the starting concentration exceeded 189 $\mu\text{mol/l}$ (23 ppm). & ☐

otic Degradation:

Naphthalene absorbs light with a wavelength greater than 290 nm and will photolyze in water(1,3). Photolysis should also occur in air but no experimental data could be found(SRC). The half-life in surface waters is calculated to be 71 hours(1,2) and longer in deeper or murky water(1). When a mixture of jet fuel was added to filtered deionized water, salt water or pond water and exposed to sunlight, 44-77% of the naphthalene in the fuel was lost in 7 days(6). The presence of algae in the water can increase the rate of photolysis of naphthalene by a factor of 1.3 to 2.7(5). If nitrite is present in the water, mutagenic products are formed during photolysis(4). Reaction with oxidizing species in natural waters as well as hydrolysis will not be significant(3). & ☐

Naphthalene in air reacts with photochemically generated hydroxyl radicals, the rate constant being 2.16×10^{-11} $\text{cm}^3/\text{mole} \cdot \text{sec}$ (1-2,5). Its half-life is about 8 hr in clean air and 3 hr in moderately polluted air(1-3). The loss of naphthalene due to reaction with N_2O_5 and O_3 in air is negligible(1,3,6). In polluted urban air, reaction with NO_3 radicals may be an additional sink for night time loss(4). & ☐

The mineralization of (^{14}C)-labelled naphthalene was studied in pristine and oil-contaminated soil slurry (30% solids) under denitrifying conditions using a range of concentrations from below to above the aqueous phase saturation level. Results from sorption-desorption experiments indicated that

naphthalene desorption was highly irreversible and decreased with an increase in the soil organic content, thus influencing the availability for microbial consumption. Under denitrifying conditions, the mineralization of naphthalene to CO₂ occurred in parallel with the consumption of nitrate and an increase in pH from 7.0 to 8.6. When the initial substrate concentration was 50 ppm (ie close to the aqueous phase saturation level), about 90% of the total naphthalene was mineralized within 50 days, and a maximum mineralization rate of 1.3 ppm/day was achieved after a lag period of approx 18 days. When added at concentrations higher than the aqueous phase saturation level (200 and 500 ppm), similar mineralization rates (1.8 ppm/day) occurred until about 50 ppm of the naphthalene was mineralized. After that the mineralization rates decreased logarithmically to a minimum of 0.24 ppm/day for the rest of the 160 days of the experiments. For both of these higher concentrations, the reaction kinetics were independent of the concentration, indicating that desorption of the substrate governs the mineralization rate. Other results indicated that pre-exposure of soil to oil contamination did not improve the degradation rates nor reduce the lag periods. This study clearly shows the potential of denitrifying conditions for the biodegradation of low molecular weight polyaromatic hydrocarbons. ⚡

ENVIRONMENTAL TRANSPORT ▲

concentration:

Naphthalene bioconcentrates to a moderate amount in fish and aquatic invertebrates (log BCF 1.6-3.0)(1-6). However, at least for invertebrates, depuration is rapid when the organism is placed in water free of the pollutant(6-7) and naphthalene is also readily metabolized in fish(8). ⚡

... Some marine organisms have no detectable aryl hydrocarbons hydroxylase enzyme systems, namely: phytoplankton, certain zooplankton, mussels (*Mytilus edulis*), scallops (*Placopecten* sp), and snails (*Littorina littorea*). ... Those organisms which lack a metabolic detoxification enzyme system, tend to accumulate polycyclic aromatic hydrocarbons. /Polycyclic aromatic hydrocarbons/ ⚡

Bioaccumulation, especially in vertebrate organisms, is considered to be short-term, and is not considered an important fate process. /Polycyclic aromatic hydrocarbons/ ⚡

POLYCYCLIC AROMATIC HYDROCARBONS (PAH) WERE ANALYZED IN SURFACIAL SEDIMENTS & BENTHIC ORGANISMS IN SOUTHEASTERN LAKE ERIE, NEAR A LARGE COAL-FIRED POWER PLANT. SEDIMENT CONC (530-770 PPB PAH) WERE RELATIVELY HOMOGENOUS THROUGHOUT MOST OF THE 150 SQUARE KM AREA, ALTHOUGH RIVER & NEARSHORE CONCENTRATIONS REACHED 4 PPM. OLIGOCHAETE WORMS DID NOT BIOCONCENTRATE (ON WET WT BASIS) ANY OF THE PAH. CHIRONOMID MIDGES COLLECTED 1 KM OFFSHORE EXHIBITED BIOCONCENTRATION OF 5 PAH ONE OF WHICH WAS PYRENE. FURTHER OFFSHORE, THESE APPARENT BIOCONCENTRATIONS DISAPPEARED, WITH MIDGES AT NEAR EQUILIBRIUM WITH SEDIMENTS. ⚡

Adsorption/Mobility:

Naphthalene is adsorbed moderately by soil and sediment. 17 soils and sediment had a mean K_{oc} of 871(1) and soils from Switzerland had a K_{oc} of 812(3). A mean K_{oc} of 2400 was measured for 4 silt loams and a sandy loam soil(2), a mean K_{oc} of 594 (range 420-830) for 5 soils of different clay and organic carbon content(14), and a K_{oc} of 4100 was measured for natural estuarine colloids(12). After a release of petroleum derived fuels or solvents, nonaqueous phase liquids are retained in the pore space of soils or as a thin film. Soils contaminated with residual hydrocarbons adsorb naphthalene to a much greater extent, (nearly 2 orders of magnitude greater in Lincoln sand) than in natural soil(13). Partitioning to the

residual hydrocarbons occurred independently of that to the soil organic carbon. While sorption decreased somewhat as a result of weathering, high retention persisted after extensive weathering. Although it adsorbs to aquifer material(10), in simulations of groundwater transport systems and rapid infiltration sites, and in field studies, naphthalene frequently appears to infiltrate(4-9). Partitioning to dissolved organic matter can reduce the apparent partitioning to soil and facilitate transport in soil(15). A half-life of 65 hr due to sediment adsorption in a flowing river of 1 m depth and 0.5 m/sec has been predicted(11). In a variety of surface waters only 0.1-0.8% of the naphthalene was sorbed to particulate matter(11). ☺☹

atilization from Soil/Water:

The laboratory determined half-life for the evaporation of naphthalene from water 1 m deep with a 1 m/sec current velocity and a 3 m/sec wind speed is 4.1-5 hr(1,2). In the case of naphthalene the rate of volatilization is much more sensitive to the current velocity and a 10 fold decrease in current to 0.1 m/sec will increase the half-life to 32 hours whereas 10 fold decrease in wind speed to 0.3 m/sec will increase the half-life to 11 hr(1). The rate of evaporation of naphthalene in jet fuel from water relative to the oxygen reaeration rate ranged from 0.2 to 0.5 which when combined with typical reaeration rates for natural bodies of water(4) give a half-life for evaporation of 50 and 200 hr in a river and lake respectively(3). Estimated volatilization half-lives from a soil containing 1.25% organic carbon were 1.1 day from 1 cm soil depth and 14.0 days from 10 cm soil depth(5). In moisture-saturated soil as in the case of flooded soil, volatilization may not be important(6). ☺☹

VIRONMENTAL CONCENTRATIONS ▲

ter Concentrations:

DRINKING WATER: Naphthalene measured as follows: Washington DC tap water - 1 ppb(1). 3 New Orleans area drinking water plants sampled - detected but not quantified(2). 12 Great Lake municipalities drinking water supplies - 0.9 to 1271 ppb, with levels being generally higher in winter(3). Cincinnati, OH, Feb 1980 - 5 parts/trillion(5). Drinking waters - up to 1.4 ppb(4). 2 representative US cities, tap water - not detected, 14% frequency in source for city A - 7.8 ppb avg, 23% frequency in source for City B - 23.0 ppb avg(6). ☺☹

DRINKING WATER: Naphthalene measured as follows: Rhine River water, the Netherlands, bank-filtered tap water - 100 parts/trillion(1). Kitakyushu area Japan - 2.2 ppb(2). Zurich Switzerland, tap water - 8 parts/trillion(3,6). Ottawa, Ontario - January, 1978 - 4.8 parts/trillion, February, 1978 - 6.8 parts/trillion(4). 4 of 5 Nordic tap water, - 1.2 to 8.8 parts/trillion(5). ☺☹

GROUNDWATER: Naphthalene was detected as follows: Hoe Creek, NY, underground coal gasification site, 2 aquifers sampled 15 months after gasification complete - 380 to 1800 ppb(1). Samples from East Anglica, England chalk aquifer 10, 100-120, and 210 m distance from gasoline storage - 150, 30, and 0.1 ppb resp(2). 3 of 4 rapid infiltration sites, Fort Polk, LA - 0.03 to 0.22 ppb, 1 of 4 sites not quantified(3). Zurich, Switzerland - not detected(4). Gas Works Park, Seattle, WA - sites of coal and oil gasification plant that ceased operation in 1956: 9 of 15 wells positive for naphthalene above the 0.005 mg/L detection limit, 0.02-12 mg/L(5). Representative, highly impacted groundwater at five sanitary landfill sites in southern Ontario: <0.2, 19, 21, 60, and 61 ppb(6). Detected in groundwater near Falmouth, MA in infiltration site for secondary effluent used since 1936(7). ☺☹

SURFACE WATER: Lake Michigan - a trace detected at 5 of 9 sites(7). Delaware River studies ranged from a trace to 0.9 ppb(1,5). Ohio River between Wheeling and Evansville (5 samples) and 3 tributaries - detected at a detection limit of 0.1 ppb(3). Charles River, Boston - detected at a detection

PHENANTHRENE

Hazardous Substances Data Bank Number: 2166

Last Revision Date: 970423

1.0 CHEMICAL AND PHYSICAL PROPERTIES

Color/Form:

MONOCLINIC PLATES FROM ALCOHOL
COLORLESS SHINING CRYSTALS
LEAFLETS

Odor: Faint aromatic odor

Boiling Point: 340 DEG C

Melting Point: 101 DEG C

Molecular Weight: 178.22

Density/Specific Gravity: 0.9800 @ 4 DEG C

Heat of Combustion: 1,685.6 kcal @ 25 deg C

Heat of Vaporization: 14,184.0 gcal/g mole

Octanol/Water Partition Coefficient: Log Kow= 4.57 (measured)

Solubilities:

1 G IN 60 ML COLD OR 10 ML BOILING 95% ALCOHOL; IN 25 ML ABSOLUTE ALCOHOL; 2.4 ML TOLUENE OR CARBON TETRACHLORIDE; 2.0 ML BENZENE; 1.0 ML CARBON DISULFIDE; 3.3 ML ANHYD ETHER; SOL IN GLACIAL ACETIC ACID; ORG SOLVENTS, ESPECIALLY IN AROMATIC HYDROCARBONS
SOL IN HOT PYRIDINE. IN CHLOROFORM
1.6 mg/l at 15 deg C; 0.423 ppm at 8.5 deg C; 0.816 ppm at 21 deg C; 0.6 + or - 0.1 ppm at 22 deg C 1.277 ppm at 30 deg C

Vapor Density: 6.15 (air= 1 at boiling point of phenanthrene)

Vapor Pressure: 1 mm Hg @ 118.2 deg C; 10 mm Hg @ 173.0 deg C; 40 mm Hg @ 215.8 deg C; 100 mm Hg @ 249.0 deg C; 400 mm Hg @ 308.0 deg C

2.0 TOXICITY/BIOMEDICAL EFFECTS

SUMMARY

Evidence for Carcinogenicity:

Avail data are inadequate to permit an evaluation of the carcinogenicity of phenanthrene to exptl animals.

CLASSIFICATION: D; not classifiable as to human carcinogenicity. BASIS FOR

CLASSIFICATION: Based on no human data and inadequate data from a single gavage study in rats and skin painting and injection studies in mice. HUMAN CARCINOGENICITY DATA:

None. ANIMAL CARCINOGENICITY DATA: None.

A1. A1= Confirmed human carcinogen. (1981) /Coal tar pitch volatiles, as benzene solubles/

TOXICITY VALUES

Ecotoxicity Values:

TLm (median lethal dose) *Neanthes arenaceodentata* 0.6 ppm/96 hr in seawater at 22 deg C in a static bioassay

IARC Summary and Evaluation:

No data are available in humans. Inadequate evidence of carcinogenicity in animals. OVERALL EVALUATION: Group 3: The agent is not classifiable as to its carcinogenicity to humans.

3.0 ENVIRONMENTAL FATE/EXPOSURE POTENTIAL

SUMMARY

Environmental Fate/Exposure Summary:

Release of phenanthrene (PHEN) most likely results from the incomplete combustion of a variety of organic compounds including wood and fossil fuels. Release to the soil will likely result in biodegradation. Volatilization is not expected to be significant. Phenanthrene is expected to bind strongly to soil and not leach extensively to groundwater. When released to water, adsorption of PHEN to suspended sediments is expected to remove most of the compound from solution. Photolysis is expected to occur near the water surface and biodegradation of phenanthrene in the water column is expected. Oxidation, volatilization and bioconcentration are not expected to be significant. Phenanthrene released to the atmosphere is expected to rapidly adsorb to particulate matter. Phenanthrene adsorbed on fly ash has been shown to photolyze rapidly (half-life 49 hr) and Phenanthrene adsorbed on particulate matter will be subject to wet and dry deposition. Vapor phase phenanthrene will react with photochemically generated, atmospheric hydroxyl radicals with an estimated half-life of 1.67 days. PHEN is a contaminant in air, water, sediment, soil, fish and other aquatic organisms and food. Human exposure results primarily from ingestion of food contaminated with PHEN. (SRC)

4.0 EXPOSURE STANDARDS AND REGULATIONS

OCCUPATIONAL PERMISSIBLE LEVELS

OSHA Standards:

Meets criteria for OSHA medical records rule.

Coke oven emissions 150 ug/cu m, 8 hr time-weighted average. /Coke oven emissions/

NIOSH Recommendations:

NIOSH considers coal tar products carcinogenic and conditions should be made to keep exposures as low as possible. Current NIOSH research indicates that asphalt products are carcinogenic to laboratory animals and, therefore may be more toxic to humans than previously believed. /Coal tar products/

Occupational exposure standard: 0.1 mg/cu m for cyclohexane extractable fraction. /Coal tar pitch volatiles/

OTHER STANDARDS AND REGULATIONS

Clean Water Act Requirements:

Toxic pollutant designated pursuant to section 307(a)(1) of the Clean Water Act and is subject to effluent limitations. /Polynuclear aromatic hydrocarbons/

For the maximum protection of human health from the potential carcinogenic effects due to exposure of polynuclear aromatic hydrocarbons through ingestion of contaminated water and contaminated aquatic organisms, ... therefore, the levels which may result in incremental increase of cancer risk over the lifetime are estimated at 1×10^{-5} , 1×10^{-6} , and 1×10^{-7} . The corresponding criteria /for ambient water/ are 28.0 ng/l, 2.8 ng/l, and 0.28 ng/l, respectively. If the above estimates are made for consumption of aquatic organisms only, excluding consumption of water, the levels are 311.0 ng/l, 31.1 ng/l, and 3.11 ng/l respectively. /Polynuclear aromatic hydrocarbons based on benzo(a)pyrene as the model PAH/

The attempt to develop a drinking water criterion for polynuclear aromatic hydrocarbons (PAH) as a class is hindered by several gaps in the scientific data base: (1) The PAH class is composed of numerous compounds having diverse biological effects and varying carcinogenic potential. A "representative" PAH mixture, has not been defined. (2) The common practice of using data derived from studies with benzo(a)pyrene to make generalizations concerning the effects of environmental PAH may not be scientifically sound. (3) No chronic animal toxicity studies involving oral exposure to PAH mixtures exist. (4) No direct human data concerning the effects of exposure to defined PAH mixtures exist. /Polynuclear aromatic hydrocarbons/

CERCLA Reportable Quantities:

Persons in charge of vessels or facilities are required to notify the National Response Center (NRC) immediately, when there is a release of this designated hazardous substance, in an amount equal to or greater than its reportable quantity of 1 lb or 0.454 kg. The toll free telephone number of the NRC is (800) 424-8802; in the Washington metropolitan area (202) 426-2675. The rule for

PYRENE

HSDB - Hazardous Substances Data Bank: 4023, last revised: 970423

1.0 CHEMICAL AND PHYSICAL PROPERTIES

Color/Form:

- 1.monoclinic prismatic tablets from alcohol or by sublimation;
Pure pyrene is colorless
- 2.pale yellow plates (when recrystallized from toluene)
- 3.Colorless solid (tetracene impurities give yellow color)

Boiling Point: 393 deg C at 760 mm Hg; 260 deg C at 60 mm Hg

Melting Point: 156 DEG C

Molecular Weight: 202.26

Density/Specific Gravity: 1.271 AT 23 DEG C

Octanol/Water Partition Coefficient: Log Kow= 4.88

Solubilities:

1. 0.135 MG/L (+ or - 0.005 MG/L) IN WATER AT 25 DEG C
2. SOL IN CARBON DISULFIDE, & TOLUENE
3. SOL IN ALC, ETHER, BENZENE, & PETROLEUM ETHER

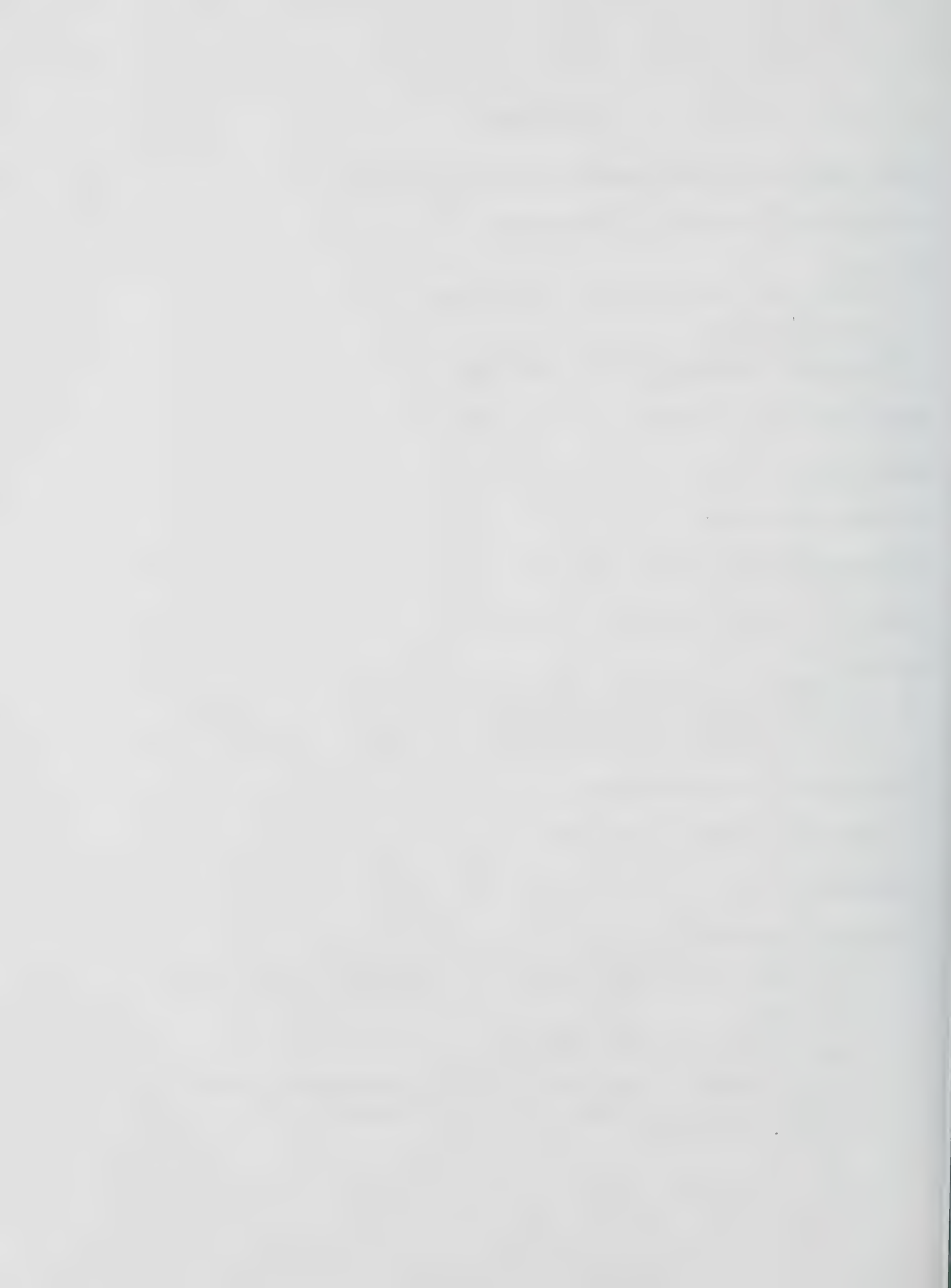
Vapor Pressure: 6.85×10^{-7} torr at 20 deg C

2.0 TOXICITY/BIOMEDICAL EFFECTS

SUMMARY

Evidence for Carcinogenicity:

1. CLASSIFICATION: D; not classifiable as to human carcinogenicity.
BASIS FOR CLASSIFICATION: Based on no human data and inadequate data from animal bioassays.
HUMAN CARCINOGENICITY DATA: None.
ANIMAL CARCINOGENICITY DATA: Inadequate.
2. No data are available in humans. Inadequate evidence of carcinogenicity in animals.
OVERALL EVALUATION: Group 3: The agent is not classifiable as to its carcinogenicity to humans.



TOXICITY VALUES

Ecotoxicity Values:

TLm (Median threshold limit) Mosquito fish 0.0026 mg/l/96 hr at 24-27 deg C in a static bioassay

IARC Summary and Evaluation:

No data are available in humans. Inadequate evidence of carcinogenicity in animals.

OVERALL EVALUATION: Group 3: The agent is not classifiable as to its carcinogenicity to humans.

3.0 ENVIRONMENTAL FATE/EXPOSURE POTENTIAL

SUMMARY

Environmental Fate/Exposure Summary:

Pyrene's release to the environment is ubiquitous since it is a ubiquitous product of incomplete combustion. It is largely associated with particulate matter, soils and sediments. Although environmental concentrations are highest near sources, its presence in places distant from primary sources indicates that it is reasonably stable in the atmosphere and capable of long distance transport. When released to air it may be subject to direct photolysis, although adsorption to particulates apparently can retard this process. Half-lives for reaction of vapor phase pyrene with atmospheric pollutants are: O₃, 0.67 days, NO₂, 14 days; estimated half-life for reaction with photochemically produced hydroxyl radicals is 1.12 days. If released to water, it will adsorb very strongly to sediments and particulate matter, bioconcentrate in aquatic organisms slightly to moderately, but will not hydrolyze. It may be subject to significant biodegradation, and direct photolysis may be important near the surface of waters. Evaporation may be important with a half-life of 4.8 to 39.2 days predicted for evaporation from a river 1 m deep, flowing at 1 m/sec with a wind velocity of 3 m/sec; half-life for evaporation from a model pond was 1176 days. Adsorption to sediments and particulates will limit evaporation. If released to soil it will be expected to adsorb very strongly to the soil and will not be expected to appreciably leach to the groundwater, although its presence in groundwater illustrates that it can be transported there. It will not be expected to hydrolyze or significantly evaporate from soils and surfaces. It may be subject to appreciable biodegradation in soils. Human exposure will be from inhalation of contaminated air and consumption of contaminated food and water. Especially high exposure will occur through the smoking of cigarettes and the ingestion of certain foods (eg, smoked and charcoal-broiled meats and fish). (SRC)

4.0 EXPOSURE STANDARDS AND REGULATIONS

OCCUPATIONAL PERMISSIBLE LEVELS

OSHA Standards:

Meets criteria for OSHA medical records rule.

NIOSH Recommendations:

1. NIOSH considers coal tar products carcinogenic and conditions should be made to keep exposures as low as possible. Current NIOSH research indicates that asphalt products are carcinogenic to laboratory animals and, therefore may be more toxic to humans than previously believed. /Coal tar products/
2. Coal tar products 0.1 mg/cu m, 10 hr time-weighted average. /Coal tar products/
3. Occupational exposure standard: 0.1 mg/cu m for cyclohexane extractable fraction. /Coal tar pitch volatiles/

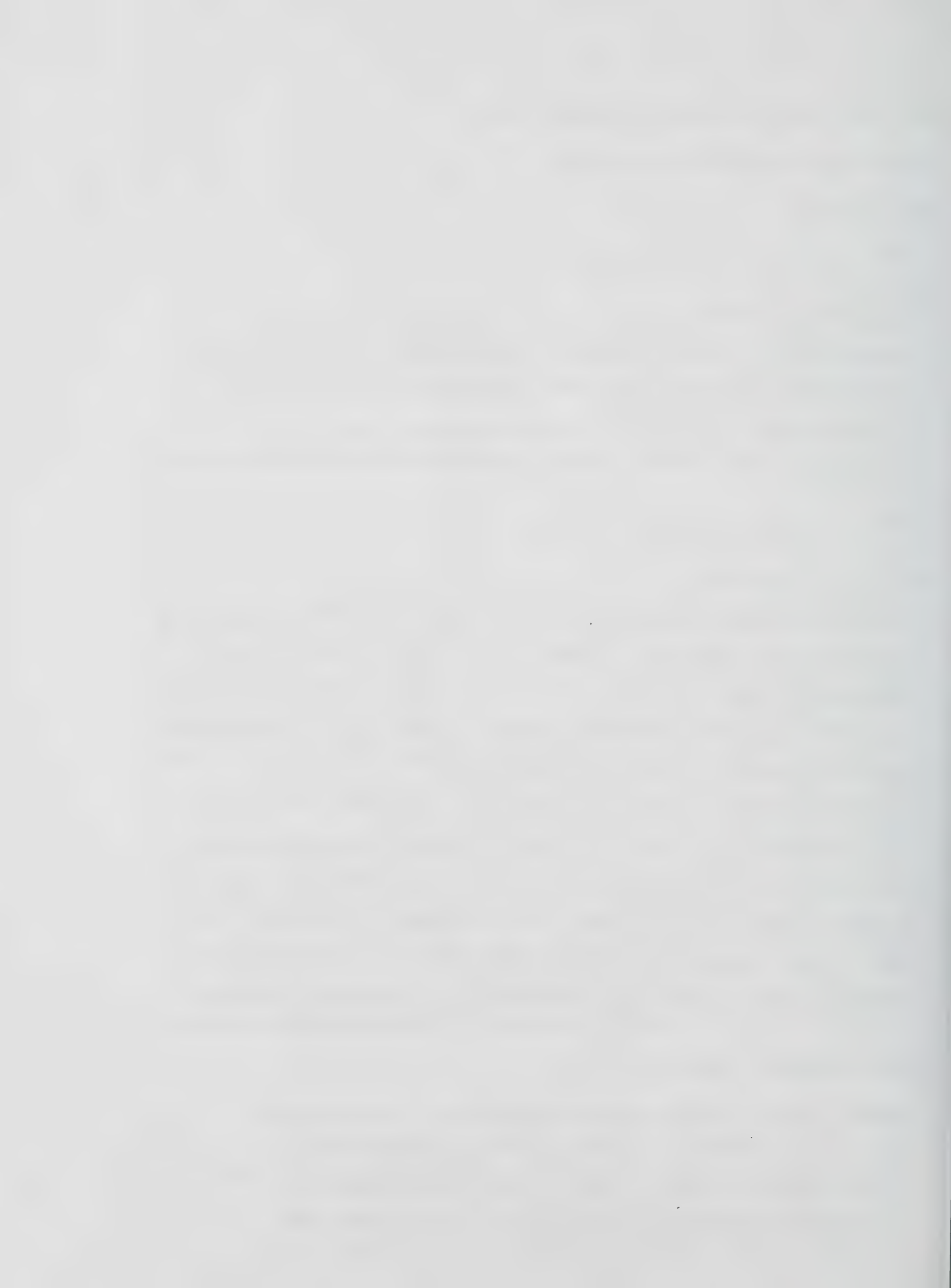
OTHER STANDARDS AND REGULATIONS

Clean Water Act Requirements:

1. For the maximum protection of human health from the potential carcinogenic effects due to exposure of polynuclear aromatic hydrocarbons through ingestion of contaminated water and contaminated aquatic organisms, ... therefore, the levels which may result in incremental increase of cancer risk over the lifetime are estimated at 1×10^{-5} , 1×10^{-6} , and 1×10^{-7} . The corresponding ambient water criteria are 28.0 ng/l, 2.8 ng/l, and 0.28 ng/l, respectively. If the above estimates are made for consumption of aquatic organisms only, excluding consumption of water, the levels are 311.0 ng/l, 31.1 ng/l, and 3.11 ng/l respectively. /Polynuclear aromatic hydrocarbons based on benzo(a)pyrene as the model PAH/
2. Toxic pollutant designated pursuant to section 307(a)(1) of the Clean Water Act and is subject to effluent limitations. /Polynuclear aromatic hydrocarbons/
3. The attempt to develop a drinking water criterion for polynuclear aromatic hydrocarbons (PAH) as a class is hindered by several gaps in the scientific data base: (1) The PAH class is composed of numerous compounds having diverse biological effects and varying carcinogenic potential. A "representative" PAH mixture, has not been defined. (2) The common practice of using data derived from studies with benzo(a)pyrene to make generalizations concerning the effects of environmental PAH may not be scientifically sound. (3) No chronic animal toxicity studies involving oral exposure to PAH mixtures exist. (4) No direct human data concerning the effects of exposure to defined PAH mixtures exist. /Polynuclear aromatic hydrocarbons/

CERCLA Reportable Quantities:

Persons in charge of vessels or facilities are required to notify the National Response Center (NRC) immediately, when there is a release of this designated hazardous substance, in an amount equal to or greater than its reportable quantity of 5,000 lb or 2,270 kg. The toll free telephone number of the NRC is (800) 424-8802; In the Washington metropolitan area (202) 426-2675. The rule for determining when notification is required is stated in 40 CFR 302.6 (section IV. D.3.b).



TOULENE

1.0 CHEMICAL AND PHYSICAL PROPERTIES

Color/Form

Colorless Liquid

Boiling Point: 111° C (232° F)

Melting Point: -95° C (-139° F)

Octanol/Water Partitiion Coefficient:

Solubility: (H2O) Negligible (Less than 0.1 %)

Vapor Pressure(MM HG): 22

2.0 TOXICITY/BIOMEDICAL EFFECTS

SUMMARY

Cancer Hazard

- * Toluene may cause mutations (genetic changes) in living cells. Whether or not it poses a cancer hazard needs further study.

Reproductive Hazard

- * Toluene may damage the developing fetus.

Other Long Term Effects

- * Repeated exposure may damage bone marrow, causing low blood cell count.
- * Prolonged contact can cause drying and cracking of the skin, and a rash.
- * Repeated Toluene exposure can cause headaches, loss of appetite, nausea, and liver and kidney damage, and may cause brain damage.

Toxicity: LD50 (ORAL-RAT)(MG/KG) - 5000
LD50 (IPR-MOUSE)(MG/KG) - 1.12
LD50 (SKN-RABBIT) (G/KG) - 14
LC50 (INHL-MOUSE-8H) (PPM) - 5320

Carcinogenicity: NTP: No IARC: No Z LIST: No OSHA REG: No

3.0 ENVIRONMENTAL FATE/EXPOSURE POTENTIAL

Toluene is obtained mainly from tar oil. It is used to make many organic compounds, such as benzoic acid, benzaldehyde, dyes, and explosives. It is a commonly used solvent for extraction processes. It may enter the environment mainly from industrial discharges.

Acute toxic effects may include the death of animals, birds, or fish, and death or low growth rate in plants. Acute effects are seen two to four days after animals or plants come in contact with a toxic chemical substance.

Toluene has moderate acute toxicity to aquatic life. Toluene has caused leaf membrane damage in plants. Insufficient data are available to evaluate or predict the short-term effects of toluene to birds or land animals.

Chronic toxic effects may include shortened lifespan, reproductive problems, lower fertility, and changes in appearance or behavior. Chronic effects can be seen long after first exposure(s) to a toxic chemical.

Toluene has moderate chronic toxicity to aquatic life. Insufficient data are available to evaluate or predict the long-term effects of toluene to plants, birds, or land animals.

Toluene is slightly soluble in water. Concentrations of less than 1 milligram will mix with a liter of water.

Toluene is non-persistent in water, with a half-life less than 2 days. The half-life of a pollutant is the amount of time it takes for one-half of the chemical to be degraded. About 99.5% of toluene will eventually end up in air; the rest will end up in the water.

Some substances increase in concentration, or bioaccumulate, in living organisms as they breathe contaminated air, drink contaminated water, or eat contaminated food. These chemicals can become concentrated in the tissues and internal organs of animals and humans.

The concentration of toluene found in fish tissues is expected to

be somewhat higher than the average concentration of toluene in the water from which the fish was taken.

4.0 EXPOSURE STANDARDS AND REGULATIONS

OSHA: The legal airborne permissible exposure limit (PEL) is 200 ppm averaged over an 8 hour workshift and 300 ppm, not to be exceeded during any 15 minute work period and a maximum peak concentration of 500 ppm.

NIOSH: The recommended airborne exposure limit is 100 ppm averaged over an 8 hour workshift and 200 ppm, not to be exceeded during any 10 minute work period.

XYLENE

1.0 CHEMICAL AND PHYSICAL PROPERTIES

Color/Form

Colorless liquid with aromatic odor

Boiling Point:

o-Xylene:	292° F
m-Xylene:	282° F
p-Xylene:	282° F
m-Xylene α,α' -diamine:	477° F

Octanol/Water Partition Coefficient:

Solubility:

o-Xylene:	0.02%
m-Xylene:	Slight
p-Xylene:	0.02%
m-Xylene α,α' -diamine:	Miscible

Vapor Pressure:

o-Xylene:	7mm
m-Xylene:	9mm
p-Xylene:	9mm
m-Xylene α,α' -diamine:	0.03mm (77° F)

2.0 TOXICITY/BIOMEDICAL EFFECTS

SUMMARY

Acute Health Effects

The following acute (short term) health effects may occur immediately or shortly after exposure to Xylenes:

- * Exposure can irritate the eyes, nose and throat. Xylenes can also cause headaches, nausea and vomiting, tiredness and stomach upset. High levels can cause you to feel dizzy and lightheaded, and to pass out. Very high levels can cause death.

Chronic Health Effects

The following chronic (long term) health effects can occur at some time after exposure to Xylenes and can last for months or years:

Reproductive Hazard

- * Xylenes may damage the developing fetus.

Other Long Term Effects

- * Repeated exposure can damage bone marrow, causing low blood cell count.
- * Xylenes can damage the liver and kidneys.
- * Prolonged contact can cause drying and cracking of the skin.
- * Repeated exposure to Xylenes can cause poor memory, difficulty in concentration and other brain effects. It can also cause damage to the surface of the eye and cause stomach problems.

LD50/LC50: Inhalation, rate: LC50 = 5,000 ppm/4H; Oral, rate: LD50 = 4300 mg/kg

Carcinogenicity: Xylenes (o-, m-, p - isomers) - IARC: Group 3 carcinogen

3.0 ENVIRONMENTAL FATE/EXPOSURE POTENTIAL

Xylenes are used as solvents and in making drugs, dyes, insecticides and gasoline.

Xylene is a mixture of the three isomers of xylene (ortho, meta, and para), with possible trace amounts of ethylbenzene. It is a colorless liquid at room temperature and is flammable. Xylene is used as a solvent, as a raw material for the production of organic chemicals used to make polyester fibers, and to make dyes. Other uses are in sterilizing catgut and in microscopy. Xylene may enter the environment from industrial discharges, municipal waste treatment plant discharges, or spills.

ACUTE (SHORT-TERM) ECOLOGICAL EFFECTS

Acute toxic effects may include the death of animals, birds, or fish, and death or low growth rate in plants. Acute effects are seen two to four days after animals or plants come in contact with a toxic chemical substance.

Since comparative data on the toxicity of the several forms are

limited and inconclusive, all forms are considered equal in toxicity for purposes of these ecological fact sheets.

Xylene has high acute toxicity to aquatic life. Xylene causes injury to various agricultural and ornamental crops. Insufficient data are available to evaluate or predict the short-term effects of xylene to birds or land animals.

CHRONIC (LONG-TERM) ECOLOGICAL EFFECTS

Chronic toxic effects may include shortened lifespan, reproductive problems, lower fertility, and changes in appearance or behavior. Chronic effects can be seen long after first exposure(s) to a toxic chemical.

Xylene has high chronic toxicity to aquatic life. Insufficient data are available to evaluate or predict the long-term effects of xylene to plants, birds, or land animals.

WATER SOLUBILITY

Xylene is moderately soluble in water. Concentrations of between 1 to 1,000 milligrams will mix with a liter of water.

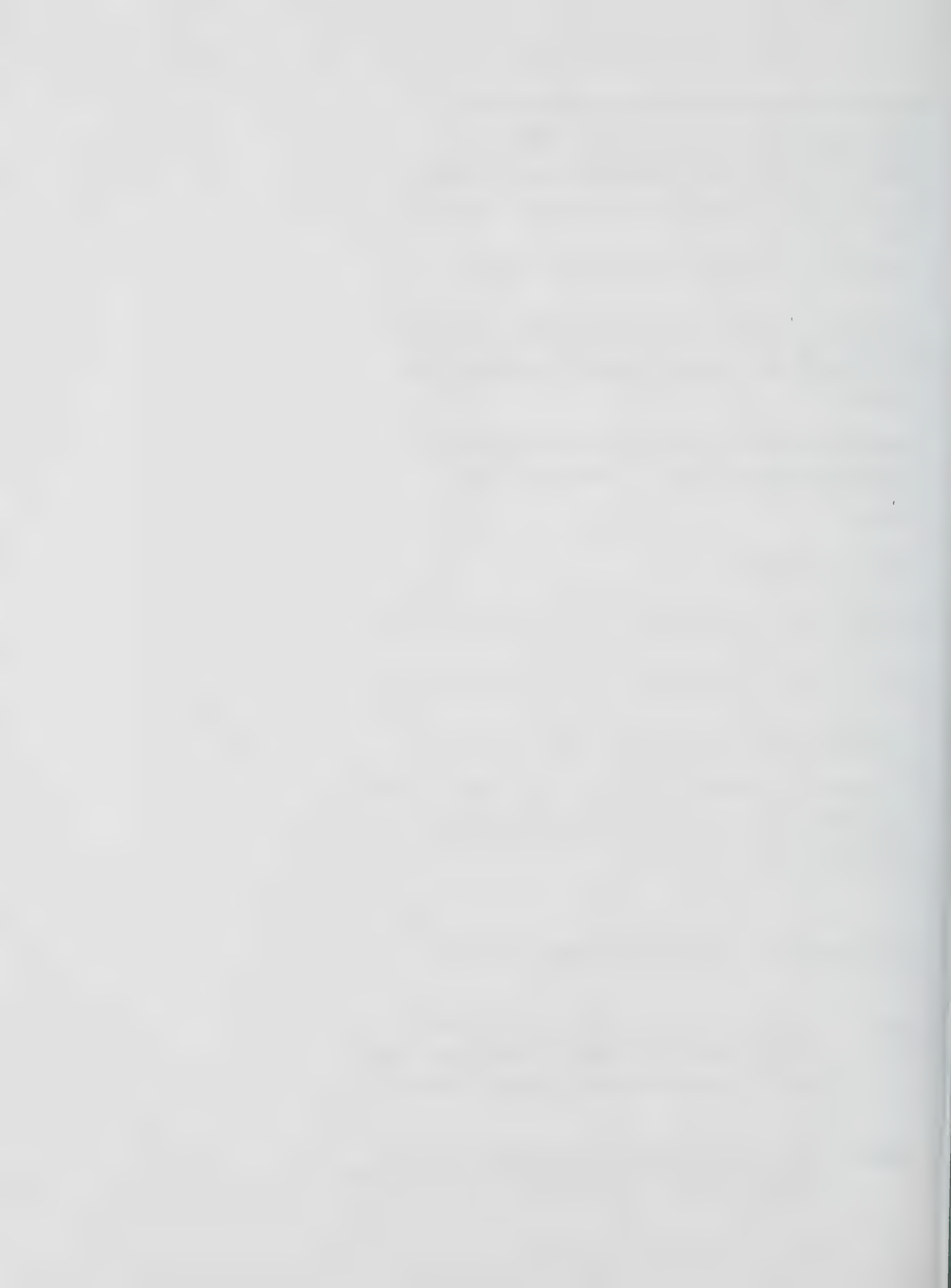
DISTRIBUTION AND PERSISTENCE IN THE ENVIRONMENT

Xylene is non-persistent in water, with a half-life of less than 2 days. The half-life of a pollutant is the amount of time it takes for one-half of the chemical to be degraded. About 99.3% of xylene will eventually end up in water; about 0.5% will end up in water; about 0.1%, respectively will end up in terrestrial soils and in aquatic sediments.

4.0 EXPOSURE STANDARDS AND REGULATIONS

OSHA: The legal airborne permissible exposure limit (PEL) is 100 ppm averaged over an 8 hour workshift and 150 ppm, not to be exceeded during any (15 minute) work period.

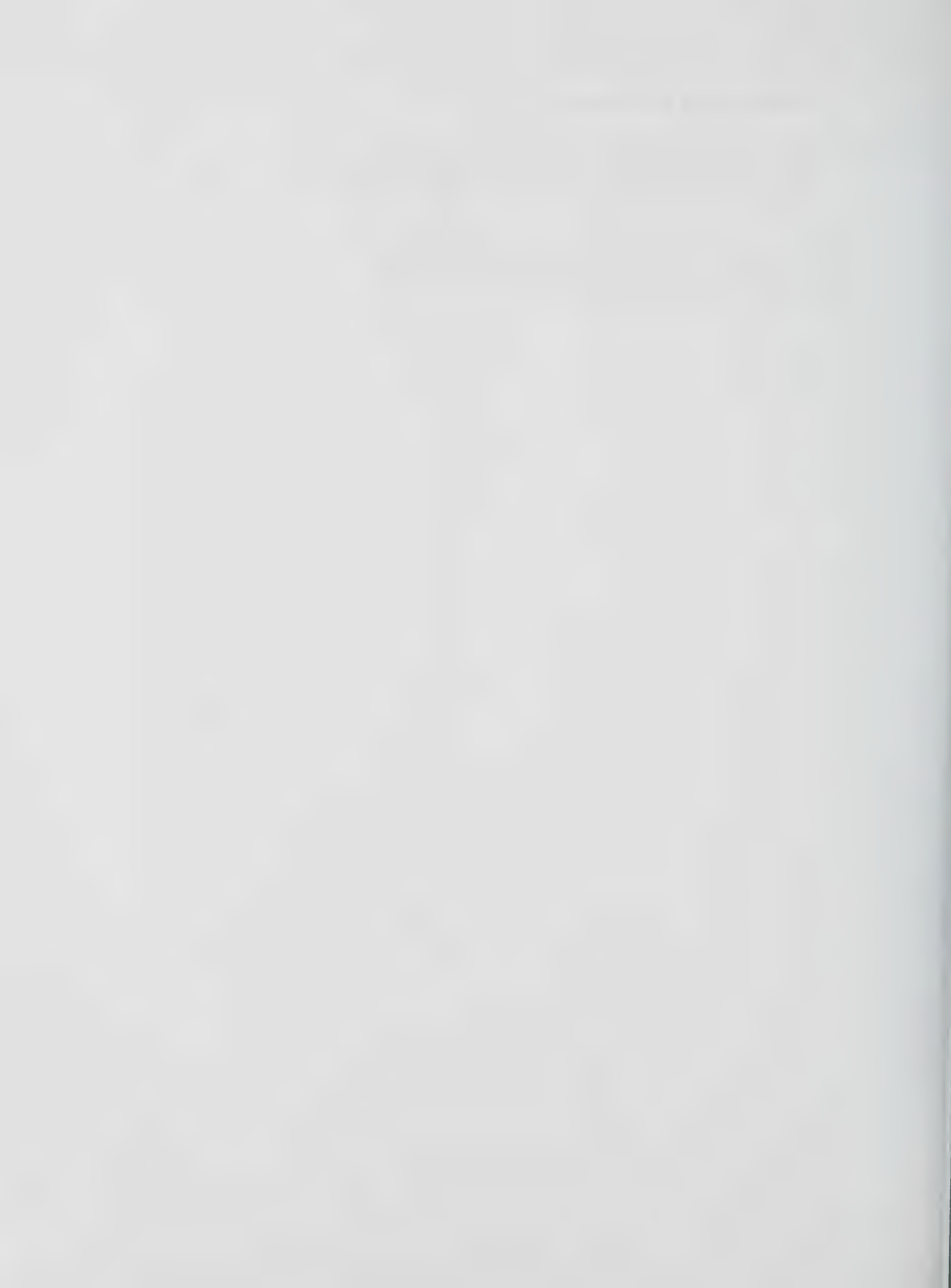
NIOSH: The recommended airborne exposure limit is 100 ppm averaged over a 10 hour workshift and 200 ppm, not to be



exceeded during any 10 minute work period.

ACGIH: The recommended airborne exposure limit is 100 ppm averaged over an 8 hour workshift and 150 ppm as a STEL (short term exposure limit).

- * The above exposure limits are for air levels only. When skin contact also occurs, you may be overexposed, even though air levels are less than the limits listed above.



ATTACHMENT "H"
BWSC FORMS

- 1. Comprehensive Response Action Transmittal Form &
Phase II Completion Statement (BWSC-108)**

(Copy only, original submitted under separate cover)



COMPREHENSIVE RESPONSE ACTION TRANSMITTAL
FORM & PHASE I COMPLETION STATEMENT

Pursuant to 310 CMR 40.0484 (Subpart D) and 40.0800 (Subpart H)

Release Tracking Number

3 - 2126

SITE LOCATION:

Name: (optional)

CLAIR MOTORS

et:

1575 VFW PARKWAY

Location Aid:

WEST ROXBURY

Town:

Boston

ZIP Code:

02132

ted Release Tracking Numbers that this Form Addresses:

3-14019

Classification: (check one of the following)

☐

Tier IA

☐

Tier IB

☐

Tier IC

☒

Tier II

☐

Not Tier Classified

If a Tier I Permit has been issued, state the Permit Number:

THIS FORM IS BEING USED TO:

(check all that apply)

Submit a Phase I Completion Statement, pursuant to 310 CMR 40.0484 (complete Sections A, B, C, G, H, I and J).

Submit a Phase II Scope of Work, pursuant to 310 CMR 40.0834 (complete Sections A, B, C, G, H, I and J).

Submit a final Phase II Comprehensive Site Report and Completion Statement, pursuant to 310 CMR 40.0836 (complete Sections A, B, C, D, G, H, I and J).

Submit a Phase III Remedial Action Plan and Completion Statement, pursuant to 310 CMR 40.0862 (complete Sections A, B, C, G, H, I and J)

Submit a Phase IV Remedy Implementation Plan, pursuant to 310 CMR 40.0874 (complete Sections A, B, C, G, H, I and J)

Submit an As-Built Construction Report, pursuant to 310 CMR 40.0875 (complete Sections A, B, C, G, H, I and J).

Submit a Phase IV Final Inspection Report and Completion Statement, pursuant to 310 CMR 40.0878 and 40.0879 (complete Sections A, B, C, E, G, H, I and J).

Submit a periodic Phase V Inspection & Monitoring Report, pursuant to 310 CMR 40.0892 (complete Sections A, B, C, G, H, I and J).

Submit a final Phase V Inspection & Monitoring Report and Completion Statement, pursuant to 310 CMR 40.0893 (complete Sections A, B, C, F, G, H, I and J).

You must attach all supporting documentation required for each use of form indicated, including copies of any Legal Notices and Notices to Public Officials required by 310 CMR 40.1400.

RESPONSE ACTIONS:

Check here if any response action(s) that serves as the basis for the Phase submittal(s) involves the use of Innovative Technologies. (DEP is interested in using this information to create an Innovative Technologies Clearinghouse.)

Describe Technologies:

PHASE II COMPLETION STATEMENT:

ify the outcome of the Phase II Comprehensive Site Assessment:

Additional Comprehensive Response Actions are necessary at this Site, based on the results of the Phase II Comprehensive Site Assessment.

The requirements of a Class A Response Action Outcome have been met and a completed Response Action Outcome Statement (BWSC-104) will be submitted to DEP.

The requirements of a Class B Response Action Outcome have been met and a completed Response Action Outcome Statement (BWSC-104) will be submitted to DEP.

Rescoring of this Site using the Numerical Ranking System is necessary, based on the results of the final Phase II Report.

PHASE IV COMPLETION STATEMENT:

ify the outcome of Phase IV activities:

Phase V operation, maintenance or monitoring of the Comprehensive Response Action is necessary to achieve a Response Action Outcome. (This site will be subject to a Phase V Operation, Maintenance and Monitoring Annual Compliance Fee.)

The requirements of a Class A Response Action Outcome have been met. No additional operation, maintenance or monitoring is necessary to ensure the integrity of the Response Action Outcome. A completed Response Action Outcome Statement (BWSC-104) will be submitted to DEP.

The requirements of a Class C Response Action Outcome have been met. No additional operation, maintenance or monitoring is necessary to ensure the integrity of the Response Action Outcome. A completed Response Action Outcome Statement (BWSC-104) will be submitted to DEP.

SECTION E IS CONTINUED ON THE NEXT PAGE



COMPREHENSIVE RESPONSE ACTION TRANSMITTAL
FORM & PHASE I COMPLETION STATEMENT

Pursuant to 310 CMR 40.0484 (Subpart D) and 40.0800 (Subpart H)

Release Tracking Number

3 - 2126

PHASE IV COMPLETION STATEMENT: (continued)

The requirements of a Class C Response Action Outcome have been met. Further operation, maintenance or monitoring of the remedial action is necessary to ensure that conditions are maintained and that further progress is made toward a Permanent Solution. A completed Response Action Outcome Statement (BWSC-104) will be submitted to DEP.

Indicate whether the operation and maintenance will be Active or Passive. (Active Operation and Maintenance is defined at 310 CMR 40.0006.)

☐ Active Operation and Maintenance

☐ Passive Operation and Maintenance

(Active Operation and Maintenance makes the Site subject to a Post-RAO Class C Active Operation and Maintenance Annual Compliance Fee.)

PHASE V COMPLETION STATEMENT:

Specify the outcome of Phase V activities:

The requirements of a Class A Response Action Outcome have been met and a completed Response Action Outcome Statement (BWSC-104) will be submitted to DEP.

The requirements of a Class C Response Action Outcome have been met. No additional operation, maintenance or monitoring is necessary to ensure the integrity of the Response Action Outcome. A completed Response Action Outcome Statement (BWSC-104) will be submitted to DEP.

The requirements of a Class C Response Action Outcome have been met. Further operation, maintenance or monitoring of the remedial action is necessary to ensure that conditions are maintained and that further progress is made toward a Permanent Solution. A completed Response Action Outcome Statement (BWSC-104) will be submitted to DEP.

Indicate whether the operation and maintenance will be Active or Passive. (Active Operation and Maintenance is defined at 310 CMR 40.0006.)

☐ Active Operation and Maintenance

☐ Passive Operation and Maintenance

(Active Operation and Maintenance makes the Site subject to a Post-RAO Class C Active Operation and Maintenance Annual Compliance Fee.)

LSP OPINION:

I test under the pains and penalties of perjury that I have personally examined and am familiar with the information contained in this transmittal form, including any and all documents accompanying this submittal. In my professional opinion and judgment based upon application of (i) the standard of care in 309 CMR 4.02(1), (ii) the applicable provisions of 309 CMR 4.02(2) and (3), and (iii) the provisions of 309 CMR 4.03(5), to the best of my knowledge, information and belief,

If Section B indicates that a Phase I, Phase II, Phase III, Phase IV or Phase V Completion Statement is being submitted, the response action(s) it is (are) the subject of this submittal (i) has (have) been developed and implemented in accordance with the applicable provisions of M.G.L. c. 21E and 310 CMR 40.0000, (ii) is (are) appropriate and reasonable to accomplish the purposes of such response action(s) as set forth in the applicable provisions of M.G.L. c. 21E and 310 CMR 40.0000, and (iii) complies(y) with the identified provisions of all orders, permits, and approvals identified in this submittal;

If Section B indicates that a Phase II Scope of Work or a Phase IV Remedy Implementation Plan is being submitted, the response action(s) that (are) the subject of this submittal (i) has (have) been developed in accordance with the applicable provisions of M.G.L. c. 21E and 310 CMR 40.0000, (ii) is (are) appropriate and reasonable to accomplish the purposes of such response action(s) as set forth in the applicable provisions of M.G.L. c. 21E and 310 CMR 40.0000, and (iii) complies(y) with the identified provisions of all orders, permits, and approvals identified in this submittal;

If Section B indicates that an As-Built Construction Report or a Phase V Inspection and Monitoring Report is being submitted, the response action(s) that (are) the subject of this submittal (i) is (are) being implemented in accordance with the applicable provisions of M.G.L. c. 21E and 310 CMR 40.0000, (ii) is (are) appropriate and reasonable to accomplish the purposes of such response action(s) as set forth in the applicable provisions of M.G.L. c. 21E and 310 CMR 40.0000, and (iii) complies(y) with the identified provisions of all orders, permits, and approvals identified in this submittal.

I am aware that significant penalties may result, including, but not limited to, possible fines and imprisonment, if I submit information which I know to be false, inaccurate or materially incomplete.

Check here if the Response Action(s) on which this opinion is based, if any, are (were) subject to any order(s), permit(s) and/or approval(s) issued by DEP or EPA. If the box is checked, you MUST attach a statement identifying the applicable provisions thereof.

SP Name: DANIEL G. JAFFE LSP #: 2347 Stamp:

Telephone: 617-776-2715 Ext.: _____

FAX: (optional) 617-629-2920

Signature: [Signature]

Date: 2/2/99





COMPREHENSIVE RESPONSE ACTION TRANSMITTAL
FORM & PHASE I COMPLETION STATEMENT

Pursuant to 310 CMR 40.0484 (Subpart D) and 40.0800 (Subpart H)

Release Tracking Number

3 - 2128

PERSON UNDERTAKING RESPONSE ACTION(S):

Name of Organization: CLARA MITOS
Name of Contact: ROSARIO BOISVERT Title: CLERK
Address: 151 RIVERMOUNT ST.
City: WEST Roxbury State: MA ZIP Code: 02132
Phone: 617-325-6200 Ext.: _____ FAX: (optional) _____

Check here if there has been a change in the person undertaking the Response Action.

RELATIONSHIP TO SITE OF PERSON UNDERTAKING RESPONSE ACTION(S): (check one)

RP or PRP Specify: ☒ Owner ☒ Operator ☐ Generator ☐ Transporter Other RP or PRP: _____

Fiduciary, Secured Lender or Municipality with Exempt Status (as defined by M.G.L. c. 21E, s. 2)

Agency or Public Utility on a Right of Way (as defined by M.G.L. c. 21E, s. 5(j))

Any Other Person Undertaking Response Action Specify Relationship: _____

CERTIFICATION OF PERSON UNDERTAKING RESPONSE ACTION(S):

ROSARIO BOISVERT, attest under the pains and penalties of perjury (i) that I have personally examined and am
familiar with the information contained in this submittal, including any and all documents accompanying this transmittal form, (ii) that, based on my inquiry
of these individuals immediately responsible for obtaining the information, the material information contained in this submittal is, to the best of my
knowledge and belief, true, accurate and complete, and (iii) that I am fully authorized to make this attestation on behalf of the entity legally responsible for
this submittal. I/the person or entity on whose behalf this submittal is made am/is aware that there are significant penalties, including, but not limited to,
possible fines and imprisonment, for willfully submitting false, inaccurate, or incomplete information.

Signature: _____ Title: CLERK

Print name of person or entity recorded in Section H: CLARA MITOS Date: _____

Address of the person providing certification, if different from address recorded in Section H: _____

City: _____ State: _____ ZIP Code: _____

Phone: _____ Ext.: _____ FAX: (optional) _____

YOU MUST COMPLETE ALL RELEVANT SECTIONS OF THIS FORM OR DEP MAY RETURN THE DOCUMENT AS
INCOMPLETE. IF YOU SUBMIT AN INCOMPLETE FORM, YOU MAY BE PENALIZED FOR MISSING
A REQUIRED DEADLINE.

ATTACHMENT "I"
PUBLIC INVOLVEMENT LETTERS

(Copies only, originals submitted to municipal officials)



IES, INC.

ENVIRONMENTAL CONSULTANTS

265 MEDFORD ST. • SOMERVILLE, MA 02143

(617) 623-8880 • FAX # (617) 629-2920

IESINC@AOL.COM

Direct Dial Numbers

David P. Borans: (617) 776-8549

Cosmo D. Capobianco: (617) 623-8883

Kerry Asetta: (617) 776-0578

David Brincheiro: (617) 776-1950

John R. DiPietro: (617) 623-6204

Gerard R. Goguen: (617) 623-5158

Daniel G. Jaffe: (617) 776-2715

February 2, 1999

Boston Public Library
Reference Room
666 Boylston Street
Boston, MA 02116

Re: Phase II Comprehensive Site Assessment
1575 VFW Parkway
West Roxbury, MA
RTN's 3-2126 & 3-14019

To Whom It May Concern:

IES, Inc. of Somerville, MA has completed a "Phase II Comprehensive Site Assessment" for the above referenced location. The purpose of this Phase II Report is to document information obtained as a result of Comprehensive Site Assessment activities and support the conclusions and opinions based upon the findings of the assessment. Finally, an MCP Method 1 Risk Assessment was also performed as part of the Phase II investigation.

The conclusion of the Phase II report is that "Comprehensive Response Actions are necessary at the site to achieve a Response Action Outcome as described in 310 CMR 40.1000". Therefore, a Phase III study is required for the identification, evaluation and selection of Comprehensive Remedial Action Alternatives as described in 310 CMR 40.0850.

Pursuant to 310 CMR 40.1405(6), a copy of the Phase II report is being submitted to the Boston Public Library in order to allow for public review of this report prior to the initiation of any response actions.

If you have any questions regarding this matter, please do not hesitate to contact our office.

Respectfully submitted,
IES, INC.

Daniel G. Jaffe, LSP (#2347)
President



IES, INC.

ENVIRONMENTAL CONSULTANTS

265 MEDFORD ST. • SOMERVILLE, MA 02143

(617) 623-8880 • FAX # (617) 629-2920

IESINC@AOL.COM

Direct Dial Numbers

David P. Borans: (617) 776-8549

Cosmo D. Capobianco: (617) 623-8883

Kerry Asetta: (617) 776-0578

David Brincheiro: (617) 776-1950

John R. DiPietro: (617) 623-6204

Gerard R. Goguen: (617) 623-5158

Daniel G. Jaffe: (617) 776-2715

February 2, 1998

Mr. John Shea
Office of Environmental Health
City of Boston Inspectional Services
1010 Massachusetts Avenue
Boston, MA 02118

Re: Phase II Comprehensive Site Assessment
1575 VFW Parkway
West Roxbury, MA
RTN's 3-2126 & 3-14019

Dear Mr. Shea:

IES, Inc. of Somerville, MA has completed a "Phase II Comprehensive Site Assessment" for the above referenced locations. In accordance with the Massachusetts Contingency Plan (310 CMR 40.1400 and 40.1403(3)(e), notice must be given to the Chief Municipal Officer and the Board of Health in which the disposal site is located.

The purpose of this Phase II Report is to document information obtained as a result of Comprehensive Site Assessment activities and support the conclusions and opinions based upon the findings of the assessment. Finally, a MCP Method 1 Risk Assessment was also performed as part of the Phase II investigation.

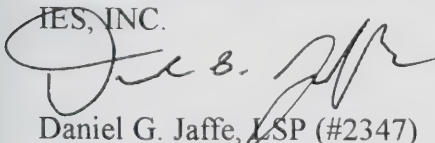
The conclusion of the Phase II report is that "Comprehensive Response Actions are necessary at the site to achieve a Response Action Outcome as described in 310 CMR 40.1000". Therefore, a Phase III study is required for the identification, evaluation and selection of Comprehensive Remedial Action Alternatives as described in 310 CMR 40.0850.

Additional information regarding the Phase II investigation can be obtained from the DEP's Northeast Regional Office at 205A Lowell Street in Wilmington, MA 01887.

If you have any questions regarding this matter, please do not hesitate to contact our office.

Respectfully submitted,

IES, INC.

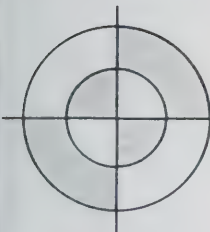

Daniel G. Jaffe, LSP (#2347)
President

IES OF CONNECTICUT: MILLION AIR • BRAINARD AIRPORT • HARTFORD, CT 06114 • (860) 724-1020

IES OF MASSACHUSETTS: 265 MEDFORD ST. • SOMERVILLE, MA 02143 • (617) 623-8880

IES OF NEW HAMPSHIRE: 460 WEST MAIN STREET • HILLSBOROUGH, NH 03244 • (603) 641-6173

IES OF NEW YORK: 10 DICKERSON AVENUE • BAYVILLE, NY 11709 • (516) 420-9518



IES, INC.

ENVIRONMENTAL CONSULTANTS

265 MEDFORD ST. • SOMERVILLE, MA 02143

(617) 623-8880 • FAX # (617) 629-2920

IESINC@AOL.COM

Direct Dial Numbers

David P. Borans: (617) 776-8549

Cosmo D. Capobianco: (617) 623-8883

Kerry Asetta: (617) 776-0578

David Brinheiro: (617) 776-1950

John R. DiPietro: (617) 623-6204

Gerard R. Goguen: (617) 623-5158

Daniel G. Jaffe: (617) 776-2715

February 2, 1999

Mayor Thomas Menino
Boston City Hall, 5th Floor
Boston, MA 02201

Re: Phase II Comprehensive Site Assessment
1575 VFW Parkway
West Roxbury, MA
RTN's 3-2126 & 3-14019

Dear Mayor Menino:

IES, Inc. of Somerville, MA has completed a "Phase II Comprehensive Site Assessment" for the above referenced locations. In accordance with the Massachusetts Contingency Plan (310 CMR 40.1400 and 40.1403(3)(e), notice must be given to the Chief Municipal Officer and the Board of Health in which the disposal site is located.

The purpose of this Phase II Report is to document information obtained as a result of Comprehensive Site Assessment activities and support the conclusions and opinions based upon the findings of the assessment. Finally, a MCP Method 1 Risk Assessment was also performed as part of the Phase II investigation.

The conclusion of the Phase II report is that "Comprehensive Response Actions are necessary at the site to achieve a Response Action Outcome as described in 310 CMR 40.1000". Therefore, a Phase III study is required for the identification, evaluation and selection of Comprehensive Remedial Action Alternatives as described in 310 CMR 40.0850.

Additional information regarding the Phase II investigation can be obtained from the DEP's Northeast Regional Office at 205A Lowell Street in Wilmington, MA 01887.

If you have any questions regarding this matter, please do not hesitate to contact our office.

Respectfully submitted,
IES, INC.

Daniel G. Jaffe, LSP (#2347)
President

